

रजिस्टर्ड नं० पी० ७००



राजपत्र, हिमाचल प्रदेश (असाधारण)

हिमाचल प्रदेश राज्यशासन द्वारा प्रकाशित

शिमला, बुधवार, २४ जून, १९७०/३ आषाढ़, १८९२

GOVERNMENT OF HIMACHAL PRADESH INDUSTRIES DEPARTMENT NOTIFICATION

Simla-4, the 11th May, 1970

No. 2-192/69-SI(WM).—In exercise of the powers conferred by section 46 of the Himachal Pradesh Weights and Measures (Enforcement) Act, 1968 (Act No. 23 of 1968), the Lieutenant Governor (Administrator), Himachal Pradesh is pleased to make the following rules, the same having been previously published as required by sub-section (4) of section 46 of the said Act.

HIMACHAL PRADESH WEIGHTS AND MEASURES (ENFORCEMENT) RULES, 1969

- Short title.** 1. These rules may be called the Himachal Pradesh Weights and Measures (Enforcement) Rules, 1969.
- Definitions.** 2. In these rules unless the context otherwise requires:—
- (a) "Act" means the Himachal Pradesh Weights and Measures (Enforcement) Act, 1968;
 - (b) "Schedule" means a Schedule appended to these rules;
 - (c) "secondary standards" means the set of standard weights and measures referred to in section 4 of the Act;
 - (d) "working standards" means the set of standard weights and measures referred to in section 3 of the Act;
 - (e) all words and expressions used but not defined in these rules and defined in the Act shall have the meaning respectively assigned to them in the Act.
- Reference Standards. Secondary Standards.** 3. The reference standards shall be kept in the custody of the Controller.
4. (1) The secondary standards shall conform as regards denominations, material used in construction and design, to the specifications laid down in Schedule I.
- (2) The secondary standards shall be kept at such places, in such manner and in such custody as the Controller may direct.
 - (3) A secondary standard shall be verified with the reference standard at least once in every period of five years, adjusted, if necessary, and marked with the date of verification, by the Controller.
 - (4) The limits of error which may be tolerated in the secondary standards on verification or reverification after adjustment shall be as specified in Schedule I.
 - (5) Subject to any rules that may be made under the Standards of Weights and Measures Act, 1956.
- Working Standards.** 5. (1) The working standards shall conform as regards denominations, material used in construction and design, to the specifications laid down in Schedule II.
- (2) The working standards shall be prepared at such place and authenticated by such person or authority as may be specified by the Government.
 - (3) The working standards shall be kept in the custody of the Inspectors.
 - (4) A working standard shall be verified with the secondary standard at least once in every twelve months, adjusted, if necessary, and stamped with the date of verification by the Controller or such other person as may be authorised by him in this behalf.
 - (5) Subject to any rules that may be made under the Standards of Weights and Measures Act, 1956.
 - (6) The limits of error which may be tolerated in the working standards on verification or reverification after adjustment shall be as specified in Schedule II.
- Secondary standard balances** 6. (1) A set of secondary standard balances shall be maintained in every place where the secondary standards are kept.
- (2) The number, types and specifications of such balances shall be as laid down in Schedule III.

(3) The Controller shall cause to be verified such balances at least once in every twelve months and shall cause them to be adjusted, if necessary, to make them correct within the limits of sensitiveness and to be stamped with the date of verification.

7. (1) The Controller shall supply to every Inspector a set of working standard balances with each set of working standard weights.

Working
Standard
Balances.

(2) The types and specifications of such balances shall be as laid down in Schedule IV.

(3) The Controller shall cause to be verified such balances at least once in every twelve months and shall cause the same to be adjusted, if necessary, to make them correct within the limits of sensitiveness and to be stamped with the date of verification.

8. Commercial weights and measures of length and capacity shall conform as regards denominations, material used in construction and design to the specifications laid down in Schedule V:

Commercial
weights and
measures.

Provided that (i) the scripts to be used in marking the denominations of commercial weights and measures of length and capacity and the name or trade-mark of the manufacturer, shall be:—

(a) the Devnagri script; and (b) the Roman script or the script of any of the languages specified in the Eighth Schedule to the Constitution;

(ii) the numerals used shall be Indo-Arabic numerals.

9. No weight other than a bullion weight shall be used in any transaction for trade or commerce in bullion and no weight other than a carat weight shall be used in any transaction for trade or commerce in precious stones.

Bullion
weights and
carat
weights.

10. (1) All weighing and measuring instruments used, or intended to be used, in transactions for trade or commerce shall conform as regards capacities, material and design, to the specifications laid down in Schedule VI and Schedule VII.

Weighing
and measur-
ing instru-
ments.

(2) The limits of error which may be tolerated in such weighing and measuring instruments during verification and inspection shall be as specified in Schedule VI and Schedule VII.

(3) No person shall use in any transaction for trade or commerce in any commodity a beam scale the sensitivity or sensitiveness of which is lower than that of the beam scale prescribed for that commodity under paragraph 2 (b) of Part II of Schedule VI.

(4) (a) Notwithstanding anything contained in sub-rules (1) and (2) where any weighing or measuring instrument in use at the commencement of these rules is converted to the metric system and its capacity after conversion cannot be made to conform to any of the specifications laid down in Schedule VI, such instrument may continue to be used but the limits of error which may be tolerated in such instrument during verification and inspection shall be as for the same type of instrument of the next higher capacity specified in the said Schedule.

(b) Where the capacity of any such instrument in terms of any weight or measure other than those of a standard mass or measure does not exactly correspond to any capacity of such instrument in terms of a standard mass or measure as specified in Schedule VI and Schedule VII, the limits of error and sensitiveness which may be tolerated shall be determined taking into account the limits of error and sensitiveness of the next higher and the next lower capacities, and assuming the limits to be proportionate to capacity.

(5) Every person using a beam scale in transactions for trade or commerce in his premises shall suspend the same to a stand or to a chain by a hook:

Provided that this rule shall not apply to hawkers and persons selling goods in periodical bazars:

Provided further that if the Government, is satisfied that the requirements of this sub-rule cannot be immediately complied with by any other class of persons, it may, by notification in the Official Gazette exempt such class of persons from the provisions of this sub-rule for such period as may be specified in such notification.

Commercial
Weights etc.
to be verified
periodically.

¶ 11. (1) All measuring instruments used or intended to be used in transactions for trade or commerce, and all weights, measures and weighing instruments used or intended to be used in transactions for trade or commerce in bullion or precious stones or by a factory as defined in the Factories Act, 1948, shall be verified and stamped in accordance with the Act and these rules at least once in a period of twelve months.

(2) All other weights, measures and weighing instruments used or intended to be used in transactions for trade or commerce shall be verified and stamped in accordance with the Act and these rules at least once in a period of 24 months.

(3) Notwithstanding anything contained in sub-rule (1) or sub-rule (2) any weighing or measuring instrument which has been verified and stamped *in situ* shall, if it is removed and re-erected before the expiry of the period referred to in that sub-rule, be verified and stamped in accordance with the Act and these rules on such removal or re-erection.

12. Notwithstanding anything contained in rule 11, any weight, measure or weighing or measuring instrument which has been once verified and stamped in accordance with the rules then in force may, where the Government has by notification in the Official Gazette specified a period in this behalf, within that period, be re-verified and stamped in accordance with the rules which were in force at the time of the first verification and stamping:

Provided that the period so specified shall in no case exceed ten years and may be different for different classes of weights, measures or weighing or measuring instrument.

Inspection
and verification
of
weights etc.

13. (1) An Inspector shall visit every factory and other place in the area under his charge where weights, measures, and weighing and measuring instruments are used, or kept for use, in transactions for trade or commerce, for verifying the same at least once during the period specified in rule 11, and may also, from time to time, make such surprise visits as he may deem necessary.

(2) All weights, measures, and weighing and measuring instruments shall be tested in a clean condition, and if necessary, the Inspector shall require the owner or user to clean them.

(3) Where a weight or measure or weighing or measuring instrument is brought to any Inspector for re-verification, the Inspector shall deal with it in the same manner as upon verification but it shall not be necessary for him to test a glass or earthenware measure, unless the original stamp has been defaced.

(4) Every person using any weight, measure or weighing or measuring instrument in transactions for trade or commerce shall present such weight, measure or weighing or measuring instrument for verification at the office of the Inspector or at such other place as the Inspector may specify in this behalf, on or before the date on which verification falls due:

Provided that where any such weighing or measuring instrument is of a type which cannot be moved from its location, such person shall report the date on which the verification falls due to the Inspector and thereupon, the Inspector shall take steps for verification of such weighing or measuring instrument.

(5) The denomination or capacity of a weight, measure, weighing or measuring instrument, if not marked in full, shall be indicated by one of the abbreviations specified in Schedule VIII.

(6) Provision relating to the weighment done for trade and by vehicle/cart loads:—

(a) Vehicle or cart weighed on a weighbridge shall not be unloaded within a radius of 10 metres from the place where the weighbridge is fixed:

Provided that the Government may allow exemption in respect of certain class of trade or trade premises from operation of this rule and the Controller may reduce the distance for any trade premises for the purpose of this rule.

(b) No weighment shall be done on a weighbridge after sunset or before sunrise, unless adequate arrangement of lighting is made.

(c) The gross or tare weights of commodities in vehicle-load or cart-load shall immediately be recorded by the trader or his agent and a signed record of weighment shall be handed over to the person concerned after each weighment is completed and before the vehicle or cart is removed from the weighbridge.

(d) A trader shall provide such number of standard weights not exceeding one-fourth of the capacity of the machine as may be required by the Inspector for the purpose of verification, re-verification and inspection of weighing instruments of capacities of above five hundred kg.

(e) To ensure a proper check of the accuracy of weighbridges and platform machines, a trader shall keep at each weighbridge one tonne of standard weights or standard weights equal to one-half of the capacity of the machine whichever is less along with a set of small standard weights of such denominations as may be directed by the Controller:

Provided that the Controller may fix the total number of standard weights not exceeding one tonne to be maintained in trade premises where the number of weighing machines is more than one.

(f) A trader or his agent shall notify to the Controller and Inspector the site of all weighbridges or platform machines and the names of persons using or operating such weighbridges or machines at least a month before the commencement of their use or operation and get them verified and stamped well in advance of their use.

(g) No weighbridge or platform machine after it has been so verified and stamped by an Inspector, shall be removed or dismantled from its original site without the prior approval of the Controller or Assistant Controller.

(h) A trader or his agent shall cause to be prepared a list of persons using or operating a weighbridge or platform machine owned by him and shall display such list prominently and conspicuously at the site of use or operation of such weighbridge or platform machine.

Stamping of
weights etc.

14. (1) Before stamping any weight, measure or weighing or measuring instrument, the Inspector shall satisfy himself that such weight, measure, weighing or measuring instrument complies with the requirements of the Act and these rules.

(2) Any weight, measure, weighing or measuring instrument presented for verification shall be complete in itself, and shall not bear a manufacturer's or dealer's mark which might be mistaken for the Inspector's stamp.

(3) The Inspector shall stamp every weight, measure and weighing and measuring instrument with a stamp of uniform design issued by the Controller, indicating the area or district in which it has been stamped and the Inspector by whom it is stamped or both:

Provided that:—

(a) no weight, measure, weighing or measuring instrument shall be stamped, which is not, in the opinion of the Inspector, sufficiently strong to withstand the wear and tear of ordinary use in trade; and

(b) no weighing or measuring instrument manufactured after the coming into force of these rules other than class A beam scales shall be stamped unless provided by the manufacturer with a plug or stud of soft metal on which to place the Inspector's stamp, such plug or stud being made irremovable by under-cutting or in some other suitable manner.

(4) The Inspector shall also mark the date of stamping on all weights, measures (other than glass, earthenware and enamelled metal measures) and weighing and measuring instruments, except when the size of such weight, measure or instrument makes it impracticable.

(5) On completion of verification and stamping, the Inspector shall issue a certificate of verification in the form specified in Schedule IX to the trader.

15. The limits of error which may be tolerated in the weight or measure of an article sold or offered for sale in sealed packages or containers shall be as specified in Schedule X.

16. Weights, measures and weighing and measuring instruments, which do not conform to the requirements of these rules, shall be used for the purpose of trade and commerce, so long as the use of such weights and measures and weighing and measuring instruments is permitted under the Standards of Weights and Measures Act, 1956.

17. In carrying out his duties of inspection, verification and stamping of weights, measures and weighing and measuring instruments, *in situ* the Inspector shall observe the procedure laid down in Schedule XI in addition to that laid down in Schedules V, VI and VII.

18. Every Inspector shall submit a monthly report to the Controller, showing the work done by him, in a form approved by the Controller.

19. The Inspector, on inspection, shall obliterate the stamp on:—

- (a) any weight, measure, or weighing or measuring instrument which cannot be made to conform to the requirements of these rules;
- (b) any weight or measure, if it does not admit of proper adjustment owing to its being broken, indented or otherwise defective;
- (c) any weight or measure or weighing or measuring instrument which since the last stamping, has been repaired or re-adjusted so as to cease to conform to the requirements of these rules;
- (d) any weight or measure or weighing or measuring instrument due and not submitted for re-verification and stamping;

Sealed packages, containers etc.

Transitional Provision.

Procedure for carrying out inspection etc.

Monthly Report of Inspector.
Obliteration of stamps.

Central Act No. 89 of 1956.

(e) any weight and measure of length or capacity or a weighing or measuring instrument, if the error exceeds the limits allowed at the time of inspection:

Provided that where the error referred to in clause (e) is not, in the Inspector's judgment, such as to require the immediate obliteration of the stamp, he shall serve a notice on the trader, informing him of the defects found in the weight, measure or weighing or measuring instruments, and calling upon him to remove the defects within a stated period not exceeding eight days and shall:—

- (i) if the trader fails to have them corrected within that period obliterate the stamp; or
- (ii) if the weight, measure or measuring instrument is adjusted to remove the defects within the stated period re-verify the weight, measure or weighing or measuring instrument and stamp the same, if found correct:

Provided further that where the defect in a weighing instrument may be corrected by re-balancing, the stamp shall not be obliterated.

20. (1) Fees payable for verification and stamping of weights, measures, and weighing and measuring instruments at the office of the Inspector shall be as specified in Schedule XII.

(2) If verification is done at any premises other than the office of the Inspector, an additional fee shall be charged at half the rates specified in Schedule XII and the owner or user, as the case may be, of the weight, measure or weighing or measuring instrument, shall also pay the expenses incurred by the Inspector for visiting the premises, including the cost of transporting and handling the working standards balances and other equipment subject to a minimum of Rs. 5:

Provided that no additional fee shall be charged for verification and stamping *in situ* of:—

- (a) petrol or fuel vehicles, weighbridges, Dormant platform machines and such other instruments as may be specified in this behalf by the Controller, and
- (b) weights, measures and weighing and measuring instruments in the premises of the declared camping centres and manufacturer, or stockist, of such weights, measures and instruments.

(3) An Inspector may carry out minor adjustments on payment of such additional fees as may be fixed by the Controller in each case.

21. Notwithstanding anything in rule 20, no fee shall be payable for re-stamping any weight, measure or weighing or measuring instrument, within the period specified in rule 11 from the date on which it was last stamped, provided the original stamp was not obliterated under rule 19.

22. A weight, measure, or weighing or measuring instrument which on verification as provided in rule 11, is found to be incorrect shall be returned to the person concerned for adjustment, when the necessary adjustment has been carried out, such weight, measure or weighing or measuring instrument shall be re-verified on payment of 25% of the prescribed fees and if found correct shall be stamped.

23. Before commencing the work of verification or re-verification the Inspector shall inform the person concerned of the fees payable by him under these rules and shall receive the same, issue a receipt in the form approved by the Controller, two copies of such receipt being kept on record.

Fees for verification, adjustment and stamping.

No fees to be charged for re-stamping within a certain period.

Fees for re-verification after adjustment.

Collection of fees and deposit into the Treasury.

(2) The Inspector shall maintain a register which shall be written up from day to day and shall show the amount of fees, carriage charges collected during the day, in the forms approved by the Controller.

(3) All payments received by the Inspector during the preceding week shall be paid into the Government Treasury as soon as possible and not later than ten days, creditable to Receipt Head "XXIX-Industries-A-Industries Receipts under the Himachal Pradesh Weights and Measures (Enforcement) Act, 1968". A receipt will be obtained and intimation to that effect sent to the Controller of Weights and Measures.

(4) All payments received by the Controller and the department under section 41 of the Act shall be paid into the Government Treasury creditable to Receipt Head "XXIX-Industries-A-Industries Receipts under the Himachal Pradesh Weights and Measures (Enforcement) Act, 1968".

Seizure,
detention
and disposal
of un-autho-
rised weights,
measures
and instru-
ments.

24. (1) (i) Weights, measures and weighing and measuring instruments shall be liable to be seized and detained if:—

(a) they are not of the denominations specified in Schedules V and VI;

(b) they are false or defective;

(c) fraud is committed in using them;

(d) they are unstamped; and

(e) the stamp on them is forged or transferred.

(ii) Any article or package or container shall be liable to be seized and detained, if:—

(a) the marking of net weight or measure of the article, package or container is false;

(b) it does not bear the label as required by the Act and these rules;

or

(c) the label is transferred or forged.

(2) Any weight or measure or weighing or measuring instrument or any article or package or container seized and detained under this rule, which is not to be the subject of proceedings in a court, shall after the expiry of sixty days after its seizure, be so dealt with as the Controller may by general or special order direct, and the materials thereof shall be sold and the proceeds credited to the Government.

(3) Any weight or measure or weighing or measuring instrument or any article or package or container seized and detained under this rule, which is to be the subject of proceedings in a court, shall be produced by the Inspector before the court and shall, after conclusion of the proceedings, be taken possession of by the Inspector and dealt with in accordance with the instructions issued by the Controller in this behalf.

Qualifica-
tions of
Inspectors.

25. (1) No person shall be appointed as Inspector unless he:—

(i) is a graduate of a recognised University preferably in Economics or Science or Engineering or holds a recognised Diploma in Engineering;

(ii) is able to speak and read and write one of the regional languages of Himachal Pradesh; and

(iii) on selection, has satisfactorily completed at least fourteen weeks training in a department of Government responsible for the enforcement of weights and measures.

(2) Nothing in sub-rule (i) and (ii) shall apply to persons who have been working as Inspectors for a period of not less than a year immediately before the commencement of these rules and persons those who shall be promoted from time to time to the post of Inspectors in accordance with the Departmental Recruitment and Promotion Rules.

26. The duties of Inspector are:—

- (a) verification and stamping of weights and measures etc;
- (b) inspections;
- (c) collection of fees and other charges, and submission of the report and returns prescribed in the rules or required by the Controller;
- (d) safe custody of articles seized and detained in the course of his duty;
- (e) safe and proper custody of the secondary and working standards and other equipment entrusted to his charge;
- (f) maintenance of such books as may be specified by the Controller;
- (g) such other duties under the Act and the rules as the Controller may by special or general order specify.

Duties of Inspectors.

27. Every Inspector shall be provided by the Controller with:—

- (1) Working standards; beam scales and balances for testing weights, adequate instrumental equipment, travelling kit for inspection of such material and form as may from time to time be necessary.
- (2) Such dies, punches, stencil plates, branding irons, etching and engraving and other implements as may be necessary for affixing verification stamp, the design and number of which shall be furnished by him.
- (3) Punches of suitable sizes, eight pointed star design for the purpose of obliterating the stamps.

Inspector to be provided with working standards, beam scales and balances, etc.

28. Where in the special circumstances in any case, it appears to an Inspector to be impracticable to comply literally with any requirements of these rules, he shall consult the Controller and the Controller may, on such reference, if he thinks fit dispense with the observance of such requirement.

Exemption from observing requirements of rules.

29. (1) Every manufacturer or repairer of, or dealer in, weights, measures or weighing and measuring instruments shall obtain a licence from the Controller in the form set out in Schedule XIII, such licence may be renewed from year to year. The period of licence shall be a calendar year.

Licensing of manufacturers, repairers and dealers of Weights and Measures etc.

(2) The fees payable for such licence and its renewal shall be specified in Schedule XIV:

Provided that after 15 days of the expiry of the licence in addition to the fees chargeable as aforesaid, an extra fee at rates equal to half the rates prescribed in the said schedule shall be charged if renewed within 30 days of the date of expiry. The licence will be treated as cancelled in case it is not renewed within 30 days of the date of expiry.

The fee payable for duplicate copy of such licence shall be equal to 10% of the fees specified in Schedule XIV.

(3) The Controller may, by order, refuse to grant or renew the licence or suspend or cancel the licence of a manufacturer or repairer of, or dealer in, weights, measures, weighing and measuring instruments on the ground of want of proper and adequate workshop facilities or staff or incompetency or failure to observe any provisions of the Act or these rules:

Provided that no such order shall be made without giving the aggrieved person an opportunity of stating his case.

(4) The Controller shall maintain a register of licensed manufacturers, repairers and dealers in the form set out in Schedule XV.

30. Every manufacturer or repairer of, or dealer in, weights, measures or weighing and measuring instruments shall maintain such records in such form and submit such returns as the Controller may direct.

Records to be maintained by manufacturer.

Certificate
of verification
to be
exhibited.

31. The person to whom a certificate of verification is issued shall exhibit the same in a conspicuous place in the premises where the weights, measures or weighing or measuring instruments to which the certificate relates are used and in case of hawkers such certificate shall be kept on his person.

Penalty.

32. Any person who contravenes any provision of these rules shall on conviction be punished with fine which may extend to five hundred rupees.

Appeals.

33. (1) Any aggrieved person may prefer an appeal;

(a) from every order/decision of an Inspector to the Controller;

(b) from every order/decision of the Controller not being a decision made in appeal under sub-rule (1)(a) to the Government or any officer specially authorised in this behalf by the Government.

(2) Every such appeal shall be preferred within sixty days from the date of the decision in the form given in Schedule XVI.

(3) A court fee label of Rs. 5.00 and Rs. 10.00 shall be fixed on the appeal petition to the Controller and the Government respectively.

(4) Copy of order/decision shall be endorsed with the appeal.

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SCHEDULE 1

(See rule 4)

DENOMINATIONS, MATERIAL, SHAPE, PERMISSIBLE ERRORS
OF SECONDARY STANDARDS OF WEIGHTS AND
MEASURES

PART I—SECONDARY STANDARD WEIGHTS

1. DENOMINATIONS:

Kilogram Series	Gram Series	Milligram Series
10	500	500
5	200	200
2	200	200
2	100	100
1	50	50
	20	20
	20	20
	10	10
	5	5
	2	2
	2	2
	1	1

2. MATERIAL:

(a) Weights of 10 kg to 1 g shall be cast from admiralty bronze of the following composition:—

Constituent	Per cent
Tin	9.50 to 10.50
Zinc	1.50 to 2.50
Lead (Max.)	0.50
Nickel (Max.)	1.00
Other elements total (Max.)	0.15
Copper	Remainder

(b) Weights of 500 mg to 50 mg shall be made of cupronickel having a nominal composition, copper 79 to 81 per cent, nickel 19 to 21 per cent, total impurities not to exceed 1.5 per cent.

(c) Weights of 20 mg to 1 mg shall be made of commercially pure aluminium sheets. Copper, silicon and iron contained as impurities in commercially pure aluminium shall not exceed 0.3 per cent.

3. SHAPE:

(a) For kilogram and gram series.—Integral cylindrical body with knobs flattened at the top. Weights of 10 kg to 100 g (inclusive) shall have adjusting devices. Lead shall not be used as an adjusting material.

(b) For milligram series.—The weights shall be in the form of square sheets, one of the corners being bent at right angles.

(c) The denominations shall be marked on the weights.

4. PERMISSIBLE ERRORS:

The permissible errors in excess and in deficiency shall be as follows:—

Denomination	Permissible Error	
	in excess (mg)	in deficiency (mg)
10 kg	50	25
5 kg	25	12.5
2 kg	15	7.5
1 kg	10	5
500 g	5	2.5
200 g	4	2
100 g	3	1.5
50 g	2	1
20 g	1.5	0.75
10 g	1	0.5
5 g	0.8	0.4
2 g	0.6	0.3
1 g	0.4	0.2
500 mg	0.4	0.2
200 mg	0.2	0.1
100 mg	0.2	0.1
50 mg	0.1	0.05
20 mg	0.1	0.05
10 mg	0.05	0.02
5 mg	0.05	0.02
2 mg	0.05	0.02
1 mg	0.02	0.02

PART II—SECONDARY STANDARD CAPACITY MEASURES

1. DENOMINATIONS:

Litre Series (l)	Millilitre Series (ml)
5	500
2	200
1	100
	50
	20

2. MATERIAL:

Secondary measures of capacity shall be cast out of admiralty bronze of the same composition as is employed in the case of secondary standard weights.

3. SHAPE:

(a) The 5 litre measure shall be cylindrical and have its inside diameter equal to the height of the measure. This shall have two handles attached securely to its sides.

(b) Measures of 2 litres and below shall be of the same shape as above but shall not have any handles.

(c) The denominations of the measures shall be engraved on the outside surface.

(d) Each set of measures shall be supplied with specially selected striking glasses.

4. PERMISSIBLE ERRORS:

The permissible errors in excess and deficiency shall be as follows:—

Denomination	Permissible Error	
	in excess (g)	in deficiency (g)
5 l	2	2
2 l	1	1
1 l	0.8	0.8
500 ml	0.5	0.5
200 ml	0.4	0.4
100 ml	0.3	0.3
50 ml	0.2	0.2
20 ml	0.1	0.1

PART III—SECONDARY STANDARD LENGTH MEASURES

1. MATERIAL:

58 per cent nickel-steel.

2. SECTION:

Rectangular cross-section with dimensions 38 mm × 15 mm. The top surface shall have two rectangular grooves, along its length.

3. OVERALL LENGTH:

1030 mm.

4. GRADUATED LENGTH:

1010 mm.

5. FINISH:

Bright, highly polished.

6. GRADUATIONS:

Graduated in mm throughout.

7. THICKNESS OF GRADUATION MARKS:

Not less than 30 microns and not more than 50 microns.

8. TOLERANCE:

The maximum permissible errors in the graduations shall be:

(i) ± 25 microns between any 2 adjacent millimetre marks, provided that the error between any two consecutive centimetre marks shall also not exceed ± 25 microns.

(ii) ± 50 microns between any two marks more than 10 cm apart.

SCHEDULE II

(See rule 5)

DENOMINATIONS, MATERIAL, SHAPE, PERMISSIBLE ERRORS
FOR WORKING STANDARDS OF WEIGHTS AND MEASURES

PART I—WORKING STANDARD WEIGHTS

1. DENOMINATIONS:

Kilogram Series	Gram Series	Milligram Series
20	500	500
10	200	200
5	200	200
2	100	100
2	50	50
1	20	20
	20	20
	10	10
	5	5
	2	2
	2	2
	1	1

2. MATERIAL:

(a) Weights of 20 kg to 1 g shall be cast from admiralty bronze or cupro-nickel of the following composition:—

Constituent	Per cent
Admiralty Bronze:	
Tin	9.50 to 10.50
Zinc	1.50 to 2.50
Lead (Maximum)	0.50
Nickel (Maximum)	1.00
Other elements total maximum	0.15
Copper	Remainder
Cupro-Nickel:	
Copper	79 to 81 per cent
Nickel	19 to 21 per cent
Total impurities, not to exceed	1.5 per cent

(b) Weights of 500 mg to 100 mg shall be made of admiralty bronze (rolled) sheets. [Composition as in (a) above].

(c) Weights of 50 mg to 1 mg shall be made of commercially pure aluminium sheets. Copper, silicon and iron contained as impurities in commercially pure aluminium shall not exceed 0.3 per cent.

3. SHAPE:

(a) Weights of 20 kg and 10 kg shall be cylindrical in shape and shall be cast in two halves, the top half being screwed snugly into the bottom half. The top half shall be cast in the form of a handle for lifting purposes. The two halves after assembly shall be locked by means of a setscrew over which the seal of the verifying authority shall be stamped.

(b) Weights of 5 kg to 200 g (inclusive) shall be cast in two halves, the top half being screwed snugly into the bottom half. The top half shall be cast in the form of a knob for lifting purposes. The two halves, after assembly, shall be locked by means of setscrew, over which the seal of the verifying authority shall be stamped.

(c) Weights of 100 g to 10g (inclusive) shall be as in (b) above except that there shall be no locking arrangement.

(d) Weights of 5 g to 1g (inclusive) shall be integral solid weights.

(e) Weights of 500 mg to 1mg (inclusive) shall be of square shape with one of the sides bent at right angles to the flat surface for ease of handling.

(f) The denominations shall be marked on the weights.

4. PERMISSIBLE ERRORS:

The permissible errors in excess and in deficiency shall be as follows:—

Denomination	Permissible Errors	
	in excess (in mg)	in deficiency (in mg)
20 kg	200	100
10 kg	100	50
5 kg	50	25
2 kg	30	15
1 kg	20	10
500 g	10	5
200 g	8	4
100 g	6	3
50 g	4	2
20 g	3	1.5
10 g	2	1
5 g	1.6	0.8
2 g	1.2	0.6
1 g	0.8	0.4
500 mg	0.8	0.4
200 mg	0.4	0.2
100 mg	0.4	0.2
50 mg	0.2	0.1
20 mg	0.2	0.1
10 mg	0.1	0.05
5 mg	0.1	0.05
2 mg	0.1	0.05
1 mg	0.05	0.05

PART II—WORKING STANDARD CAPACITY MEASURES

1. DENOMINATION:

Litre Series (l)	Millilitre Series (ml)
10	500
5	200
2	100
1	50
	20

2. MATERIALS OF CONSTRUCTION:

Working capacity standards shall be pressed out of oxygen free, deoxidised annealed copper sheets of deep drawing quality.

3. SHAPE:

(i) Working standard capacity measure of 10 litres shall be cylindrical with the handles securely fixed to the sides.

(ii) All other working standard capacity measures shall also be cylindrical, but shall not be provided with handles. The diameter of each measure shall approximately be equal to the height of the measure. The measures shall be suitably reinforced.

(iii) The denominations of the working standard measures shall be engraved on the outside surface.

(iv) The outside of the body of the working standard measures shall be oxidised to give a smooth dull black surface and the inside shall be tinned.

(v) Each set of working standard capacity measures shall be supplied with specially selected striking glasses and the measures and glasses shall be securely packed in velvetlined teakwood boxes.

4. PERMISSIBLE ERRORS:

Denomination	Permissible Errors	
	in excess (in ml)	in deficiency (in ml)
10 l	8	8
5 l	4	4
2 l	2	2
1 l	1.5	1.5
500 ml	1.0	1.0
200 ml	0.8	0.8
100 ml	0.6	0.6
50 ml	0.4	0.4
20 ml	0.2	0.2

4. PIPETTE MEASURES:

Pipettes of the following description may also be used as working standard measures:—

- one mark pipettes of capacities 10 ml and 5 ml;
- graduated pipettes of capacities 5 ml graduated at every tenth of ml.

PART III—WORKING STANDARD LENGTH MEASURES

1. MATERIAL:

The working standard length measure shall be manufactured out of pure nickel (cobalt free) with a minimum of 99.0 per cent nickel.

2. SHAPE AND DIMENSIONS:

The standard shall be of rectangular cross section of dimensions 30 mm × 15 mm. The total length shall be 1030 mm. The standard shall be finished bright.

3. GRADUATIONS:

(a) The standard shall be graduated over a length of 1010 mm, from 10 mm behind the zero line to 1000 mm beyond. From -10 mm to +10 mm it shall be graduated in millimetres and from +10 mm to 10 mm, every 5 mm.

(b) The thickness of the graduation marks shall be between 50 and 80 microns.

(c) The length of the graduation marks shall be:—

On every centimetre mark	..	..	8 mm
On every 5 mm mark	..	..	5 mm
On every millimetre mark	..	..	3 mm

4. TOLERANCES:

The maximum permissible error on the length from 0 to 1000 mm shall be ± 0.1 mm, and between any two consecutive mm, 5 mm, cm, and 10 cm mark ± 0.05 mm.

5. MARKING:

The standard shall have an Ashok Chakra and a distinctive mark to identify the manufacturer engraved along the centre line of the top surface. The height of the numerals and the letters shall be approximately 3 mm.

6. PROVISION FOR STAMPING:

The standard shall be provided with a tapered hole to accommodate a stamping plug. This hole shall be approximately 5 mm in diameter and 3 mm in depth.

7. AUXILIARIES:

The standard shall be housed in a suitable teakwood box with a carrying handle.

SCHEDULE III

(See rule 6)

SPECIFICATION FOR SECONDARY STANDARD BALANCES

1. RANGE OF BALANCES:

Capacity	Sensitiveness at no load and at full load: mg/ division of scale	Scale Division
20 kg	25 mg	Not less than 1.5 mm
5 kg	7.5 mg	Not less than 1 mm
1 kg	1.5 mg	Not less than 1 mm
50 g	0.4 mg	Not less than 1 mm
2 g	0.02 mg	Not less than 0.75 mm

2. The secondary standard balances shall be used only for indoor work in laboratories.

3. The balances shall be relieved when not in operation.

SCHEDULE IV

(See rule 7)

WORKING STANDARD BALANCES

1. RANGE OF BALANCES:

Capacity	Sensitiveness: mg/division of scale	Approximate Beam length
50 kg	100	750 mm
5 kg	10	250—300 mm
200 g	1.0	150—200 mm
2 g	0.02	120—150 mm

2. TYPES:

Working standard balances shall be of both indoor and out-door types.

3. DESIGN AND CONSTRUCTION:

The balances shall be constructed of non-magnetic materials and shall be robust in construction. They shall be capable of being easily assembled. Out-door type balances shall be fitted in suitable carrying cases to enable the balances to withstand rough transport conditions. Smaller balances, i.e., capacity 5 kg and below shall be provided with glass cases. Portable balances of capacity 5 kg and below shall be fitted into one carrying case for ease of transportation.

SCHEDULE V

(See rule 8)

SPECIFICATIONS FOR COMMERCIAL WEIGHTS AND MEASURES OF LENGTH AND CAPACITY

PART I—COMMERCIAL WEIGHTS (OTHER THAN CARAT WEIGHTS)

1. DENOMINATIONS:

The denominations of the different types of weights shall be as follows:—

(a) Iron and Steel Weights:

50 kg	
20 kg	
10 kg	500 g
5 kg	200 g
2 kg	100 g
1 kg	50 g

(b) Brass and Bronze Weights:—

<i>Bullion</i>		<i>Other than Bullion</i>	
20 kg	500 g	1 kg	50 g
10 kg	200 g	500 g	20 g
5 kg	100 g	200 g	10 g
2 kg	50 g	100 g	5 g
1 kg	20 g		2 g
	10 g		1 g
	5 g		
	2 g		
	1 g		

(c) Sheet Metal Weights, Bullion and other than Bullion:

500 mg	10 mg
200 mg	5 mg
100 mg	2 mg
50 mg	1 mg
20 mg	

(d) The actual series to be used in practice shall consist of two weights of denominations 2, 20 or 200.

2. IRON AND STEEL WEIGHTS:

(a) *Materials*.—Weights of 50 kg and down to and including 5 kg shall be made only of cast iron. Weights from 2 kg down to and including 50 g may be either of cast iron or forged mild steel.

(b) *Shapes and Dimensions*.—The shapes and dimensions of cast iron weights shall conform to Fig. 1 and 2 read with Tables 1 and 2 and those of mild steel shall conform to Fig. 2 read with Table 2.

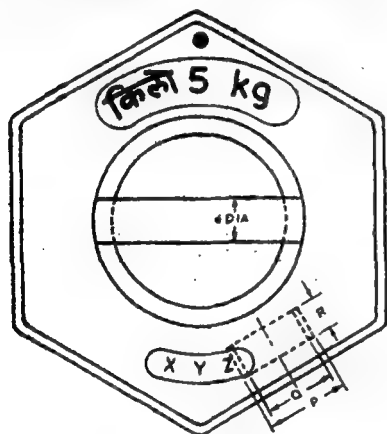


Fig. 1.—Cast Iron Weight with Cast-in Handle.



Fig. 2.—Cast Iron or Forged Mild Steel Weight.

TABLE 1.—DIMENSIONS OF CAST IRON WEIGHTS WITH HANDLES

Denomination		A	B	C	D	E	G	P	Q	R	S	T
50 kg	..	236	253	134	170	100	27	58	48	24	102	32
20 kg	..	188	200	112	113	90	21	44	38	19	66	22
10 kg	..	152	161	92	88	74	18	36	30	15	54	19
5 kg	..	125	132	75	65	62	15	29	25	12	40	16

All dimensions in millimetres.

Tolerance on dimensions ± 5 per cent.

TABLE 2—DIMENSIONS FOR CAST IRON OR FORGED MILD STEEL WEIGHTS
(All dimensions in millimetres)

Denomination	A	B	C	D	H	P	Q	R	S	T
2 kg	94	101	76	40	10	34	30	9	18	4
1 kg	73	79	60	34	8	32	28	8	16	4
500 g	57	62	46	27	6	23	20	6	13	3
200 g	43	47	36	21	6	22	20	4	9	3
100 g	34	36	28	16	4	18	16	3	7	2.5
50 g	26	28	22	13	3	16	14	3	4	2

Note.—Tolerance on dimensions:—

(a) for weights above 1 kg ± 5 per cent;

(b) for weights 1 kg and below ± 10 per cent.

(c) *Cast-in handles*.—Weights of denominations of 50 kg and down to and including 5 kg shall be provided with cast-in handles made of mild steel.

(d) *Nesting of Weights*.—Weights of denominations of 2 kg and down to and including 50 g shall nest with each other.

(e) *Loading Holes*.—Weights with cast-in handles (see Fig. 1) shall have one rectangular loading hole on the under surface, tapering outwards along the width, while the nesting weights (see Fig. 2) shall have one round loading hole, tapering outwards in the centre of the underside.

(f) Permissible Errors:

Denomination	Verification		Inspection	
	Errors in excess only		Excess	Deficiency
	mg		mg	mg
50 kg	..	20,000		10,000
20 kg	..	10,000		5,000
10 kg	..	5,000		2,500
5 kg	..	3,000	Error same as in verification.	1,500
2 kg	..	1,600		800
1 kg	..	1,000		500
500 g	..	600		300
200 g	..	400		200
100 g	..	320		160
50 g	..	240		120

Note.—New weights, when presented for checking and stamping, shall not weigh less than the denomination value plus 50 per cent of the excess tolerance shown above.

3. BRASS AND BRONZE WEIGHTS:

(a) *Materials*.—The weights shall be made of cast brass or cast bronze, or pressed or turned from brass rods.

(b) *Shapes and Dimensions*.—Brass and bronze weights shall be of the following types:—

- (i) **Bullion Weights.**—(1) Weights of denominations of 20 kg and down to and including 1 g shall be cylindrical in shape, with a handle for 20 kg and 10 kg weights, and a knob for the rest of the denominations. Shapes and dimensions shall conform to Fig. 3 and 4 read with Tables 3 and 4, respectively. Weights of 20 kg down to and including 200 g, shall be marked with the words “Bullion” and (बुलियन) within a ‘diamond’ as shown in Fig. 3 and 4, and weights of 100 g down to and including 1 g shall be marked with only a “diamond”.

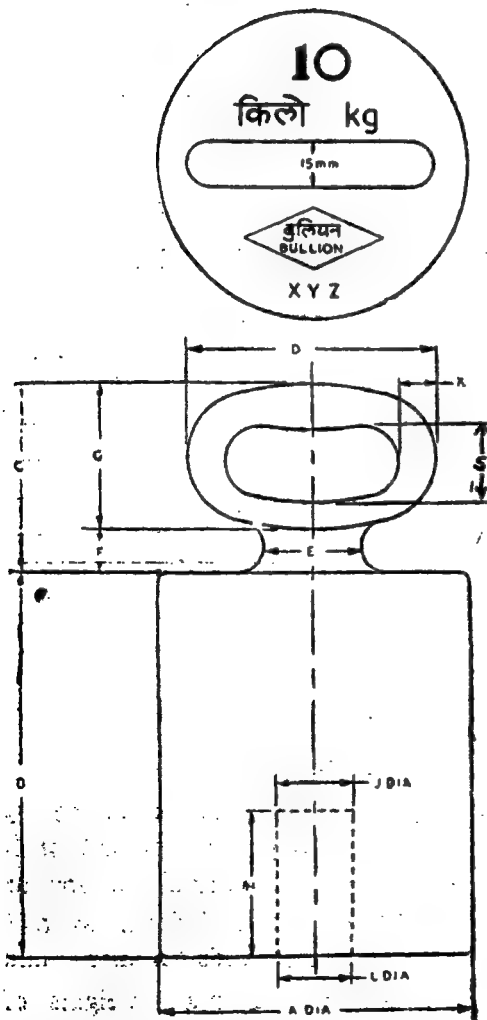


Fig. 3.—Cylindrical Bullion Weight with Handle.

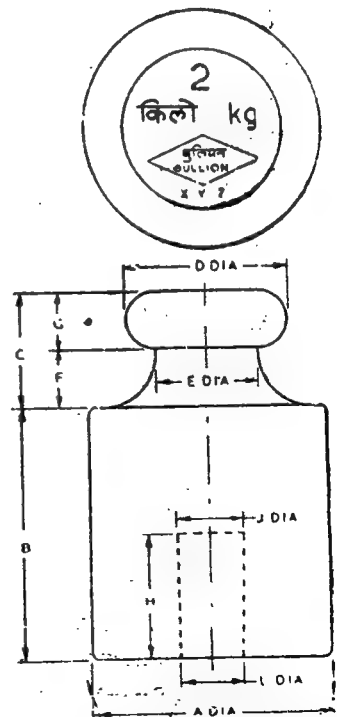


Fig. 4.—Cylindrical Bullion Weight with Knob.

TABLE 3—DIMENSIONS OF CYLINDRICAL BULLION WEIGHTS WITH HANDLE

Denomination	A	B	C	D	E	F	G	H	L	J	K	S
20 kg ..	133	157	71	106	41	16	55	51	25	26	14	25
10 kg ..	106	130	64	85	33	14	50	49	25	26	13	25

All dimensions in millimetres.

Tolerance on dimensions ± 5 per cent.

TABLE 4—DIMENSIONS OF CYLINDRICAL BULLION WEIGHTS WITH KNOB

Denomina- tion	A	B	C	D	E	F	G	H	L	J
5 kg ..	86	88	41	56	37.5	22.5	18.5	38	19	20
2 kg ..	64	67	27	39	24	14	13	27	17	17.5
1 kg ..	50	50	23.5	33	21	12	11.5	25	16	17
500 g ..	41	39	20	25	17	10.5	8.5	19	16	17
200 g ..	32	29	16	20	12	9	7	13.5	13	13.5
100 g ..	24	24	12	17	9.5	6	6	11	11	12
50 g ..	19	19	10	14	8	5	5	9	9.5	10
20 g ..	14	14	6	10	6	3	3	6	6	7
10 g ..	11	11	5	8	5	3	2	—	—	—
5 g ..	9	9	4	6	4	2	2	—	—	—
2 g ..	6	6	3	4	2	1.5	1.5	—	—	—
1 g ..	6	6	2	3	1	1	1	—	—	—

All dimensions in millimetres.

Tolerance on dimensions:—

(a) for weights above 1 kg ± 5 per cent;

(b) for weights 1 kg and below ± 10 per cent.

(ii) Weights of denominations 1 kg and down to and including 1 g shall be flat cylindrical in shape (without a knob) and shall nest with each other. Shapes and dimensions shall conform to Fig. 5 read with Table 5. Weights of 1 kg and down to and including 20 g shall be marked with the words "Bullion" and (बुलियन) within a "diamond" as shown in Fig. 5 and weights of 10 g and below down to and including 1 g shall be marked with only a diamond.

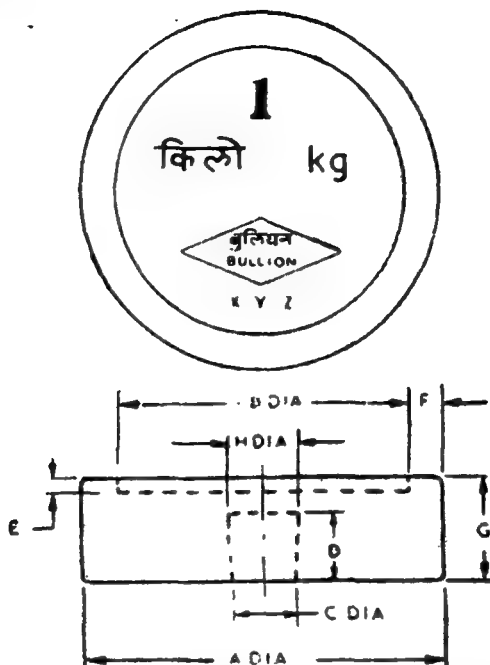


Fig. 5.—Flat Cylindrical Bullion Weight.

TABLE 5—DIMENSIONS OF FLAT CYLINDRICAL BULLION WEIGHTS

Denominations		A	B	C	D	E	F	G	H
1 kg	..	82.5	66.5	16	16	3	8	24	17
500 g	..	65	49.5	16	13	2.5	7.75	19	17
200 g	..	48	38.5	13	9.5	2.5	4.75	14	14
100 g	..	37.5	29.5	11	7	2	4	11.5	12
50 g	..	28.5	22.5	9.5	6	1.5	3	10.5	10
20 g	..	21.5	17.5	8	4	1.5	2.0	7	8
10 g	..	16.5	13.5	—	—	1	1.5	6	—
5 g	..	12.5	10.5	—	—	1	1	5	—
2 g	..	10	8	—	—	0.5	1	2	—
1 g	..	7.5	—	—	—	—	—	2.5	—

All dimensions in millimetres.

Tolerance on dimensions ± 10 per cent.

2. *Other than Bullion Weights.*—(For supplementing the iron and steel series) weights of denominations of 1 kg and down to and including 1g shall be flat cylindrical in shape and shall have a distinct downward taper. Shapes and dimensions shall conform to Fig. 6 read with Table 6.

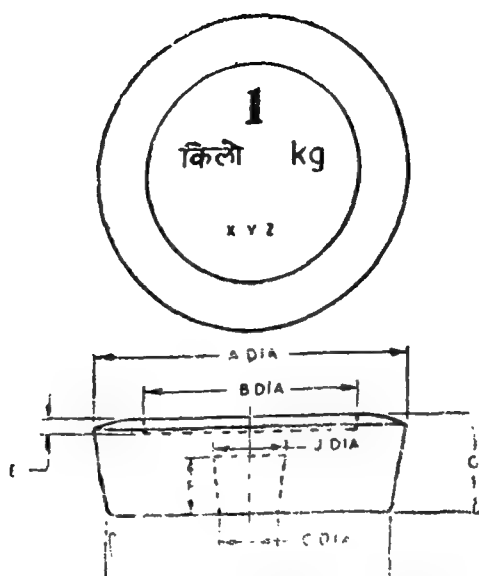


Fig. 6.—Flat Cylindrical Weight.

TABLE 6—DIMENSIONS OF FLAT CYLINDRICAL WEIGHTS

Denominations	A	B	C	D	E	F	G	J
1 kg	84.5	58	16	76	4	15	25.5	20
500 g	64	46.5	16	56	3	14	23	20
200 g	50	34.5	13	45	2.5	9.5	15	15
100 g	38	26	11	33.5	2	9.5	13	13
50 g	29	20.5	10	25	2	8	11.5	12
20 g	22	16.5	8	19.5	1	4	8	10
10 g	17.5	—	—	16	1	—	6	—
5 g	13	10	—	11.0	1	—	5	—
2 g	10	7.5	—	9	0.5	—	3.5	—
1 g	8	—	—	6.5	—	—	2.5	—

All dimensions in millimetres.

Tolerance on dimensions ± 10 per cent.

(c) *Loading Holes*.—Weights of denominations 20 kg and down to and including 20g shall have a round loading hole, tapering outwards in the centre of the underside (see Fig. 3, 4, 5 and 6).

(d) *Permissible Errors:*

Denomina- tions	Verification		Inspection			
	Errors in excess only		Bullion Weights		Other than Bullion Weights	
	Bullion Weights	Other than Bullion	Excess	Deficiency	Excess	Deficiency
	mg	mg	mg	mg	mg	mg
20 kg ..	500	—	Error same	250	Error same	—
10 kg ..	250	—	as in	125	as in	—
5 kg ..	150	—	verifica-	75	verifica-	—
2 kg ..	80	—	tion.	40	tion.	—
1 kg ..	50	250		25		125
500 g ..	30	150		15		75
200 g ..	20	100		10		50
100 g ..	16	80		8		40
50 g ..	12	60		6		30
20 g ..	10	50		5		25
10 g ..	8	40		4		20
5 g ..	6	30		3		15
2 g ..	4	20		2		10
1 g ..	2	10		1		5

4. SHEET METAL WEIGHTS:

(a) *Materials*.—Sheet Metal Weights shall be made of stainless steel, aluminium brass or nickel silver sheets:

(i) *Nickel Silver Sheet*.—Nickel silver sheet should preferably have following composition:—

Constituent	Per cent by weight
Copper ..	63.0 to 66.5
Nickel ..	17.5 to 19.5
Zinc ..	Remainder.

(ii) *Stainless Steel Sheet*.—Stainless steel sheet should be preferably conform to the following composition:—

Constituent	Per cent by weight
Carbon, max. ..	0.16
Silicon, min. ..	0.20
Manganese, max. ..	2.00
Nickel ..	7.0 to 10.0*
Chromium ..	17.0 to 20.0*
Sulphur, max. ..	0.045
Phosphorus, max. ..	0.045

*Nickel plus chromium not less than 25.0 per cent.

(b) *Shapes and Dimensions*.—(1) *Other than Bullion Weights*—After bending along one of the sides (see Fig. 7) the weights shall have the dimension as given in Table 7, and the following shapes:—

Denomination	Shape
500, 50, 5 ..	Hexagon
200, 20, 2 ..	Square
100, 10, 1 ..	Triangle

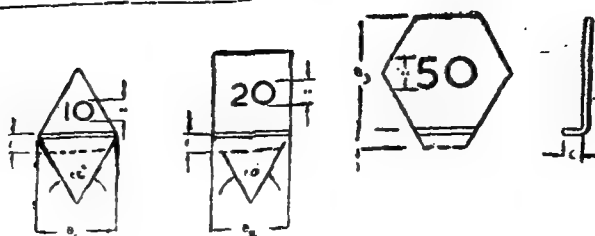


Fig. 7.—Sheet Metal Weights.

TABLE 7—DIMENSIONS OF SHEET METAL WEIGHTS

Denominations	B1	B2	B3	H	H
mg					
500	—	—	12	4	2
200	—	9.0	—	3.5	2
100	9.0	—	—	3.5	2
50	—	—	9.5	3	1.5
20	—	6.4	—	2.5	1.5
10	6.4	—	—	2	1.5
5	—	—	6.3	2	1
2	—	3.6	—	2	1
1	3.6	—	—	2	1

All dimensions in millimetres.

Tolerance on dimensions ± 10 per cent.

(2) *Bullion Weights*.—When intended for use in the bullion trade, sheet metal weights shall, after bending, have circular shape; their diameters shall be as given in Fig. 8 read with Table 8.

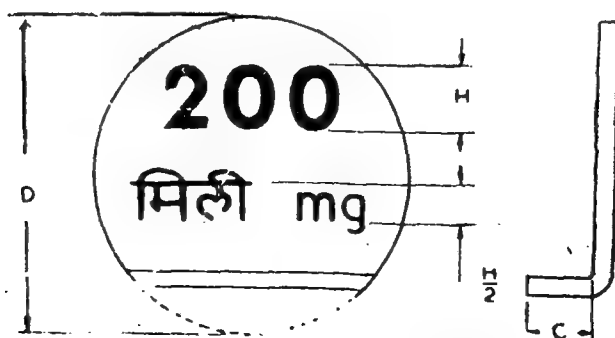


Fig. 8.—Sheet Metal Bullion Weight.

TABLE 8.—DIMENSIONS OF SHEET METAL WEIGHTS—BULLION

Denomination				D	C	H
mg						
500	..	..	..	11.0	2	2
200	..	..	..	10.0	2	2
100	..	..	..	9.0	2	2
50	..	..	..	8.0	1.5	2
20	..	..	..	6.3	1.5	1.6
10	..	..	..	5.6	1.5	1.6
5	..	..	..	5.0	1.0	1
2	..	..	..	4.0	1.0	1
1	..	..	..	3.2	1.0	1

All dimensions in millimetres.

Tolerance on dimensions ± 10 per cent.

(c) *Permissible Errors:—*

Denomina- tions	Verification			Inspection		
	Errors in Excess only					
	Bullion Weights	Other than Bullion Weights		Bullion Weights		Other than weights Bullion
				Excess	Deficiency	
mg	mg	mg	mg	mg	mg	mg
500 ..	1.6	8.0	Error same	0.8	Error same	4.0
200 ..	1.2	6.0	as in	0.6	as in	3.0
100 ..	0.8	4.0	verifica-	0.4	verifica-	2.0
50 ..	0.4	2.0	tion.	0.2	tion.	1.0
20 ..	0.4	2.0		0.2		1.0
10 ..	0.2	1.0		0.1		0.5
5 ..	0.2	0.4		0.1		0.2
2 ..	0.2	0.2		0.1		0.1
1 ..	0.1	0.1		0.05		0.05

5. MANUFACTURE AND FINISH:

General.—When the weights are cast, the castings shall be reasonably smooth and free from dross, pits, blow holes and other defects. When the weights are made by machining or forging the surface shall be reasonably smooth. Sheet metal weights shall be clearly sheared and shall be free from burrs. Cast iron and forged weights shall be coated with a thin film of suitable black paint or varnish.

The raised markings on weights shall be clean and legible. The stamped markings on sheet metal weights shall be legible and deep enough to ensure indelibility over a long period, but not so deep as to crack the sheet.

When lead is used in adjusting weights, it shall be so fitted as to ensure that it does not dislodge itself under normal conditions of use. The steel handles of cast iron weights shall be rigidly fixed.

6. MARKING:

Every weights, except weights of 10 g and lower denominations shall have the manufacturer's name or trade mark indelibly cast or stamped on it. The denominations shall be indicated in an indelible manner, with the abbreviations "kg" and (किलो) to indicate kilogram, "g" and (ग्राम) to indicate gram, and "mg" and (मिग्रा) to indicate milligram. The size of numerals and letters (letters need not be stamped on weights 50 mg and below and on bullion weights with knobs of denominations 5 g and below) indicating denominations of weights shall be at least twice the size of letters indicating the manufacturer's name or trade mark. The numerals used in the denomination shall be only Indo-Arabic figures.

7. ADJUSTMENTS:

The weights provided with loading holes shall be adjusted by pouring the required weighed quantity of molten lead into the loading hole and pressing the lead firmly. The approximate distance of the lead from the surface shall be not less than 20 per cent of the minimum thickness of the weight when new.

PART II—COMMERCIAL CARAT WEIGHTS

1. GENERAL:

(a) This part prescribes the requirements for commercial metric carat weights intended for use in weighing pearls, diamonds and other precious stones.

(b) For easy calculation and convenience in use, a carat is sub-divided into 100 parts called cents. Thus, a cent equals 2 mg. Fractions of a carat are expressed with 100 as the denominator, the numerator representing the number of cents in the fractions; for example, 0.5 carat is designated as 50/100 carat.

2. DENOMINATIONS:

(a) The denominations of the carat weights shall be as given below:—

(i) *Knob Weights*
Denominations Carat
(c)

500
200
100
50
20
10
5

(ii) *Sheet Metal Weights*
Denominations Carat
(c)

2
1
50/100
20/100
10/100
5/100
2/100
1/100
0.5/100

There shall be two weights each of the denominations 2, 20 or 200 and 2/100, 20/100 carats.

3. KNOB WEIGHTS:

(a) *Materials*.—The weights shall be made from rolled drawn or extruded material and shall not be cast.

The weights shall be made from brass, bronze, nickel-silver, non-magnetic nickel-chromium or non-magnetic stainless steel.

TABLE 1—NOMINAL DIMENSIONS OF KNOB CARAT

All Dimensions in mm

Denomina- tion (carat)	A	B	C	D	E	F	G	H	K
500 ..	12	2.5	1.25	5.0	1.5	8.0	33.2	13.26	0.40
200 ..	10	2.2	1.10	4.5	1.5	6.5	24.4	9.60	0.30
100 ..	9	2.0	1.00	4.0	1.0	6.0	19.1	7.63	0.30
50 ..	8	1.8	0.90	3.5	1.0	5.5	15.0	5.95	0.25
20 ..	7	1.7	0.85	3.0	1.0	5.0	10.8	4.13	0.25
10 ..	6	1.6	0.80	2.5	1.0	4.5	8.2	3.26	0.20
5 ..	5	1.5	0.75	2.0	1.0	4.0	6.3	2.49	0.20

Note.—The above nominal dimensions are related to a material with a density of 8.4g/cm³. To take into account variations in materials and manufacturing practices, a tolerance of ± 5 per cent is permitted on the dimensions except on C, E and K.

(b) *Shape and Dimensions.*—The shape and dimensions of the weights shall be as shown in Fig. 1 and Table 1.

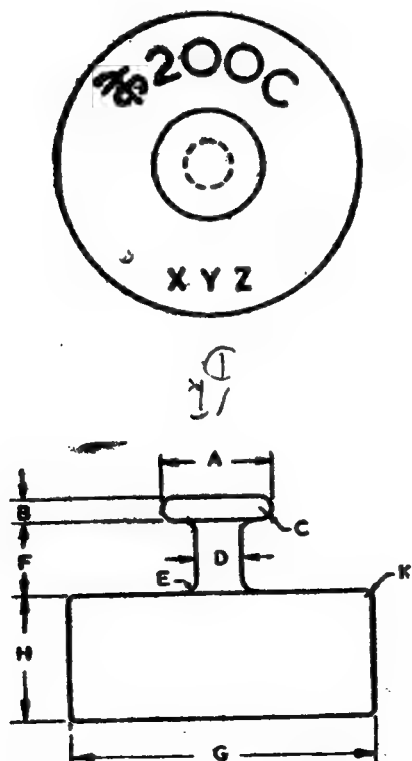


Fig. 1.—Knob Carat Weight.

(c) *Permissible Errors:—*

Denominations		Verification	Inspection	
		Errors in Excess only	Excess	Deficiency
Carat (c)		mg	mg	mg
500	..	8.0	Same as on verifications.	4.0
200	..	6.0		3.0
100	..	5.0		2.5
50	..	4.0		2.0
20	..	3.0		1.5
10	..	2.0		1.0
5	..	1.0		0.5

4. SHEET METAL WEIGHTS:

(a) *Materials.*—Weights of denominations 2/100 carat and below shall be made of aluminium sheet. Weights of higher denominations shall be made of sheets of brass, aluminium, nickel-silver, nickel-chromium or bronze.

(b) *Shape and Dimensions.*—Sheet metal weights shall be square with a raised corner for easy handling (see Fig. 2). They shall have the dimensions given in Table 2.

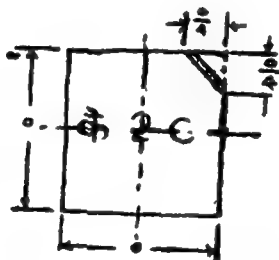


Fig. 2.—Sheet Metal Carat Weight.

TABLE 2—NOMINAL DIMENSIONS OF SHEET METAL CARAT WEIGHTS

Denominations	Size (a)
Carat (c)	mm
2	12
1	10
50/100	9
20/100	8
10/100	7
5/100	6
2/100	5
1/100	4
0.5/100	3
Tolerance	± 10 per cent.

(c) *Permissible Errors:*

Denominations	Verification		Inspection	
	Errors in Excess only		Excess	Deficiency
Carat (c)		mg	mg	mg
2	...	0.8	Same as on verification.	0.4
1	..	0.6		0.3
50/100	..	0.4		0.2
20/100	..	0.2		0.1
10/100	..	0.2		0.1
5/100	..	0.1		0.05
2/100	..	0.1		0.05
1/100	..	0.1		0.05
0.5/100	..	0.1		0.05

5. MANUFACTURE AND FINISH:

(a) The surface of the weights shall be reasonably smooth. Sheet metal weights shall be smoothly sheared and shall be free from burrs.

(b) For better stability and finish, the weights may be nickel-chromium gold or rhodium-plated.

6. MARKING:

(a) Every weights, except weights of 50 carat and lower denominations, shall have the manufacturer's name or trade mark and the denomination indelibly stamped on it. (i) The denomination shall be marked in the Indo-Arabic numerals prefixed and suffixed by the letter "के" and "c" respectively, except that in the case of weights below 50 carat, only the numerals shall be marked. The size of the numerals and letters indicating denominations of weights shall be at least double the size of letters indicating the manufacturer's name or trade mark.

(b) The marking shall be legible and deep enough to ensure indelibility over a long period of use but not so deep as to crack the weight itself.

PART III—COMMERCIAL LIQUID CAPACITY MEASURES

1. GENERAL:

This part deals with two types of cylindrical liquid measures, namely the dipping and the pouring types, and one type of conical measures.

2. DENOMINATIONS:

The denominations of the different types of measures shall be as under:—

Cylindrical Measures		Conical Measures
Dipping type	Pouring type	
1 litre	2 litres	20 litres
500 ml	1 litre	10 litres
200 ml	500 ml	5 litres
100 ml	200 ml	2 litres
50 ml	100 ml	1 litre
20 ml	50 ml	500 ml
	20 ml	200 ml
		100 ml

3. SHAPES AND DIMENSIONS:

(a) The shape and dimensions of cylindrical measures (dipping and pouring types) shall be as shown in Figs. 1 (A) and (B) and Table 1.

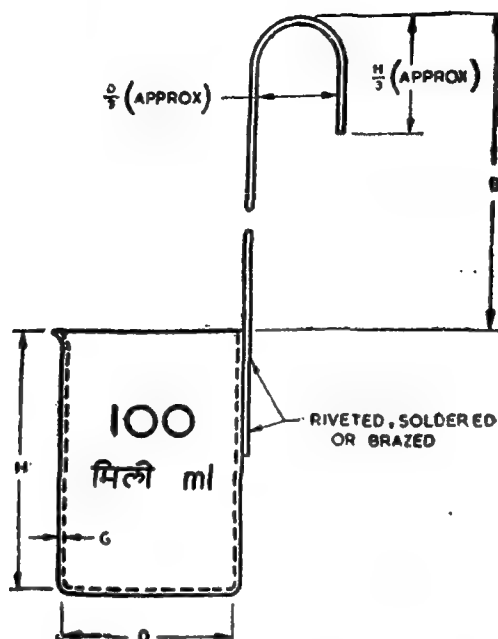


Fig. 1 (A).—Dipping Type Cylindrical Measure (Schematic).

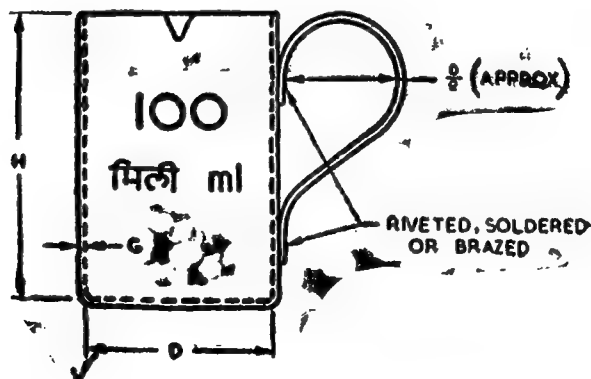


Fig. 1 (B).—Pouring Type Cylindrical Measure (Schematic).

TABLE 1—NOMINAL DIMENSIONS OF CYLINDRICAL CAPACITY MEASURES

Denominations	D	G	B max.	B min.	G min.
2 litres	120	180	360	250	1.60
1 litre	95	142	254	210	1.60
500 ml	75	114	224	160	1.60
200 ml	55.5	73	166	120	1.25
100 ml	44	66	132	100	1.25
50 ml	35	52	104	80	1.25
20 ml	26	38	76	60	1.00

Notes.—(1) All dimensions in millimetres.

(2) Tolerance on dimensions ± 10 per cent.

(b) The shape and dimensions of conical measures shall be as shown in Fig. 2 and Table 2.

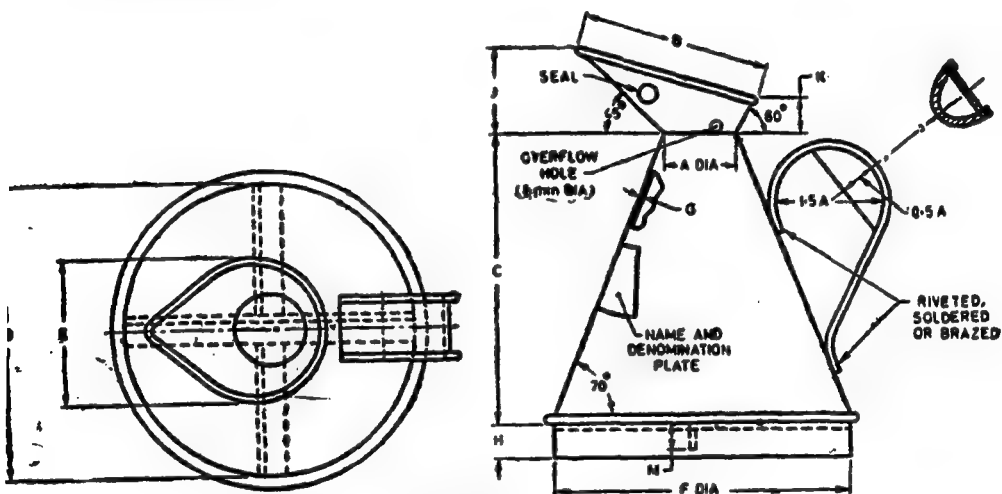


Fig. 2.—Pouring Type Conical Measure (Schematic).

TABLE 2—NOMINAL DIMENSIONS OF CONICAL CAPACITY MEASURES

Denominations	A	B	C	D	E	F	G	H	J	K	M
20 litres	97	388	388	203	194	390	1.00	35	86	29	30
10 litres	77	308	307	174	154	309	1.00	30	75	26	25
5 litres	61	244	245	147	122	247	0.800	25	65.5	24	20
2 litres	45	180	180	118	90	182	0.800	20	56	22	16
1 litre	36	143	143	95.5	72	145	0.630	20	45	18	16
500 ml	28	114	113	74	56	115	0.630	15	35.5	14	12
200 ml	21	34	84	53	42	86	0.630	10	24.5	10	8
100 ml	17	66	67	41	35	69	0.630	10	18.5	7	8

Notes.—(1) All dimensions in millimetres.

(2) Tolerance on dimensions ± 10 per cent except in case of 10 litres and 20 litres measures for which the tolerance shall be ± 5 per cent.

4. MATERIAL:

(a) *Cylindrical Measures*.—The body of cylindrical measures shall be pressed from aluminium alloy sheets, brass sheets or stainless steel sheets. The minimum thickness of the sheets shall be as specified in Table 1.

(b) *Conical Measures*.—The conical measure shall be fabricated from galvanised steel sheets, aluminium alloy sheets, copper sheets, brass sheets, stainless steel sheets or tin-plate, as may be specified by the purchaser. The minimum thickness of the sheets shall be as specified in Table 2.

(c) The handles for the measures shall be fabricated from the same material as that used for the body.

5. MANUFACTURE AND FINISH:

(a) Cylindrical measures made of brass sheets and copper sheets shall be well tinned or tinplated uniformly all over the inside as well as the outside surfaces. Conical measures made of brass sheets or copper sheets shall be well tinned or tinplated uniformly all over the inside when they are used for measuring commodities like milk, edible oils and such other food articles.

(b) The handles shall be of robust construction and shall be well formed and shaped generally as shown in Fig. 1 and Fig. 2. They shall be securely fixed to the body by means of riveting, soldering or brazing.

(c) The measures shall be free from any surface defects and indentations and shall be smoothly finished at the top.

(d) Cylindrical measures shall be provided with a well formed and proportioned spout to facilitate pouring.

(e) Conical measures shall be provided with a retaining lip to avoid spilling. The retaining lip shall be provided with a brass plug with a collar to receive the lead for the inspector's seal. A small hole, about 5 mm in diameter, shall be provided at the bottom of the retaining lip to indicate the level to which the measure shall be filled and the hole shall be located on the side at right angle to the handle. The bottom of conical measures shall suitably reinforced.

(f) The measures shall be so designed that, when they are tilted 120 degrees from the vertical, they shall become completely empty.

(g) The finished measures shall have adequate robustness for durability.

Note I.—Capacity measures when used for measuring milk shall have the handle fixed by welding, soldering or brazing so as not to leave pockets in which dirt may accumulate.

II. Dipping type cylindrical measures may also have handles substituted by two suitable but diagonally opposite brackets affixed to the walls of the measure by means of soldering, brazing or welding so as to hold the measure properly by a handle at right angles to the walls of the measure to facilitate its use in hot and boiled milk trade.

6. PERMISSIBLE ERROR:

Denominations	Verification Error in Excess only			Inspection		
	Cylindrical measures	Conical measures	Cylindrical measures excess	Deficiency	Conical measures excess	Deficiency
	ml	ml	ml	ml	ml	ml
20 l	—	100	Error	—	Error	50
10	—	50	same as	—	same as	25
5	—	30	in	—	in	15
2	30	15	verification.	15	verification.	7.5
1	20	10		10		5
500 ml	15	8		7.5		4
200 ml	8	4		4		2
100 ml	5	3		2.5		1.5
50 ml	3	—		1.5		—
20 ml	2	—		1		—

7. MARKING:

(a) Cylindrical measures shall have the denomination and manufacturer's name or trade mark indelibly stamped on it. In the case of conical measures, the denomination and manufacturer's name or trade mark shall be either embossed on the body or indelibly marked on a name plate securely fixed to the body.

(b) The denomination shall consist of Indo-Arabic numerals and the abbreviation "l" and "ली" to indicate litre, and "ml" and "मिली" to indicate millilitre. The size of numerals and letters indicating denominations on the measures shall be twice the size of the letters indicating the manufacturer's name or trade mark.

PART IV—SPECIAL MEASURES FOR PETROLEUM PRODUCTS

1. GENERAL:

This part deals with a special capacity measures which may be used for petroleum products, in addition to the conical measures prescribed in Part III of this Schedule. This measure shall not be used for other commodity.

2. DENOMINATION:

The special measure shall have a capacity of 18.5 litres.

3. SHAPE AND DIMENSIONS:

The shape and dimensions of the special measure shall be as indicated in figure 1.

4. MATERIALS:

The measure shall be fabricated from galvanised steel sheets, aluminium alloy sheets, copper sheets, brass sheets, stainless steel sheets or tin-plate. The minimum thickness of the sheet shall be as indicated in figure 1. The handle shall be fabricated from the same material as that used for the body.

5. PERMISSIBLE ERROR:

The maximum permissible errors for verification as well as for inspection shall be as follows:—

Verification	Excess only	100 ml
Inspection	Excess	100 ml
	Deficiency	50 ml

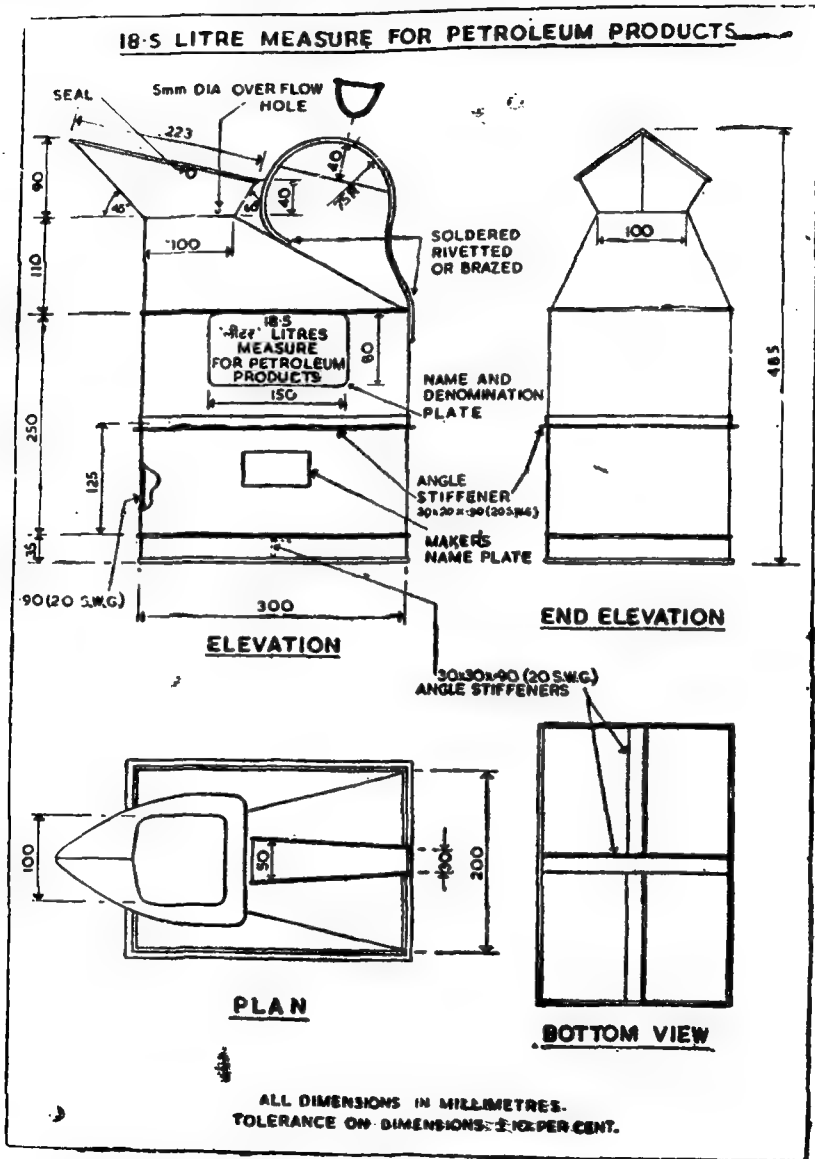


Fig. 1.—18.5 litre measure for Petroleum Products.

PART V.—DISPENSING MEASURES

1. GENERAL:

This part deals with two types of dispensing measures made of glass and transparent plastic materials, used for dispensing purposes. Conical

dispensing measures and capacity 100 ml may also be used in the sale of liquor.

2. TYPES AND DENOMINATIONS:

Dispensing measures shall be of the following types and denominations:—

- (a) Conical measures 200 ml, 100 ml, 50 ml, 20 ml, 10 ml and 5 ml.
- (b) Beaker measures 1000 ml and 500 ml.

3. MATERIALS:

(a) *Glass measures.*—The measures shall be made of a clean and transparent glass. They shall be well annealed; free from stones, cracks and chippings; and as free as possible from blisters and other defects. Lead glass shall not be used for the measures.

(b) *Transparent plastic measures.*—The measures shall be made of a clear and transparent plastic material, manufactured from plasticised polyvinyl chloride or copolymer, the major constituent of which is polyvinyl chloride. The plastic material used shall not contain any constituents known to be injurious to health and likely to be extracted by contact with liquids.

4. DEFINITION OF CAPACITY:

The capacity corresponding to any graduation mark is defined as the volume of water at 27°C, expressed in millilitres, required to fill the measure to that graduation mark at 27°C, the observer's eye being level with the front graduation mark and the lowest point of the water meniscus appearing to touch the top edge of that mark.

5. CONICAL MEASURES:

(a) *Shape.*—The measures shall be conical as shown in Fig. 1-A to 1-G, the 50 ml measures shall be either tall or squat as shown in Fig. 1-C and 1-D respectively.

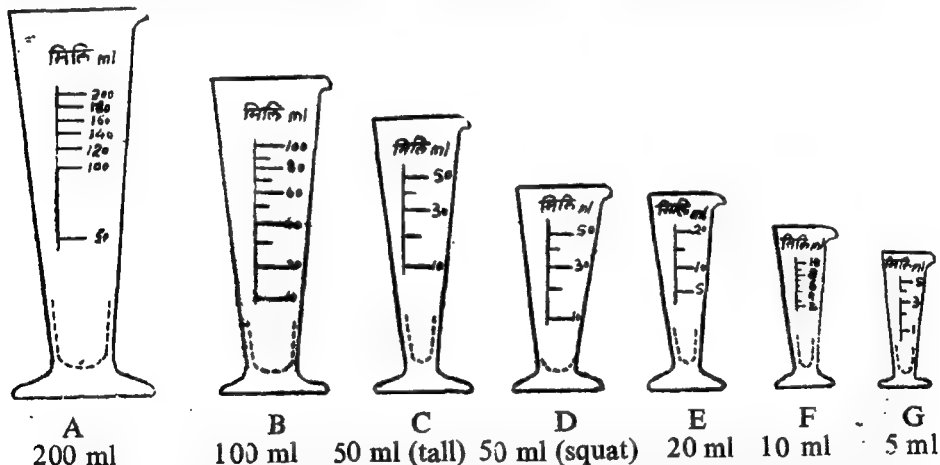


Fig. 1-A.—Conical Dispensing Measure of Metric Series—Tall and Squat Types.

(b) *Construction.*—(i) Each measure shall have a pouring lip. The form of the lip shall be such that, when the measure is filled with water to the highest graduation mark, the contents may be poured from the lip in a stream falling clear of the outside of the measures.

(ii) Each measure shall have a base on which it shall stand vertically without rocking when placed on a horizontal surface. The size of the base shall be such that the measure, when empty, shall not fall when placed

on a plane inclined at 15° to the horizontal. The bottom of the measuring space, shall be uniformly rounded and shall merge smoothly into the sides of the measure.

(iii) The wall thickness of the measures shall be sufficient to ensure sturdy construction and shall not show any local departures from uniformity.

(iv) The external surface of the measure shall be a cone having an included angle of not less than 13° and not more than 14° .

(v) The overall volume of the measure shall be such that when it is filled with water to the highest graduation mark and a volume of water equal to half its nominal capacity is added to it, there shall be no overflow. But, the addition of a further quantity of water equal to quarter the nominal capacity shall result in water overflowing from the pouring lip.

(c) *Graduation.*—(i) The conical measure shall be graduated in accordance with Table 1.

TABLE 1—DETAILS OF CONICAL MEASURES

Denominations	Graduated at	Numbered at	Back lines at	Lowest graduation mark	Height of lowest graduation mark above bottom of measuring space	Minimum Length of mark
1	2	3	4	5	6	7
ml	ml	ml	ml	ml	ml	cm
200	50, 100, 120, 140, 160, 180, 200.	50, 100, 120, 140, 160, 180, 200.	50, 100, 200.	50	6.5 ± 0.5	2.0
100	Every 10 ml from 10 to 100 ml.	10, 20, 40, 60, 80, 100.	20, 60, 100.	10	3.0 ± 0.5	1.75
50	(Tall) every 10 ml from 10 to 50 ml.	10, 30, 50	30, 50	10	4.0 ± 0.5	1.5
50	(Squat) Every 10 ml from 10 to 50 ml.	10, 30, 50	30, 50	10	2.0 ± 0.5	1.5
20	Every 5 ml from 5 to 20 ml.	5, 10, 20	10, 20	5	2.5 ± 0.5	1.25
10	Every ml from 2 to 10 ml.	2, 4, 6, 8, 10	2, 6, 10	2	2.5 ± 0.5	1.0
5	Every ml from 1 to 5 ml.	1, 3, 5	3, 5	1	2.5 ± 0.5	0.75

(ii) With the pouring lip of measure facing to the right, the front graduation marks shall be placed at right angles to, and on the right hand side of vertical line extending from above the top graduation mark to near the base of the measure and below the bottom graduation mark.

(iii) The graduation marks shall be marked as shown in Fig. 1-A to 1-G. The marks shall be engraved or etched and they shall be of a uniform thickness not exceeding 0.3 mm, provided that they may taper slightly towards the end. The graduation marks shall lie in planes perpendicular to the axis of the measure and shall be horizontal when the measure is standing on the horizontal surface.

(iv) Each graduation number shall be etched or engraved close to the end of the graduation mark to which it relates and in such manner that it would be bisected by a prolongation of that graduation mark.

(v) The numbered graduation marks shall have the minimum length specified in column (7) of Table 1. The un-numbered graduation marks shall be at least two-third the length of the numbered graduation marks and clearly shorter than the numbered marks.

(vi) The height of the lowest graduation mark above the lowest point of the bottom of the measuring space shall be within the limits given in column (6) of Table 1.

(b) *Permissible errors.*—The permissible errors in capacity shall not exceed the figures given below (See Table 2). The permissible errors in excess or deficiency shall be the same for verification or inspection.

TABLE 2—PERMISSIBLE ERRORS IN CAPACITY OF CONICAL MEASURES

Capacity corresponding to graduation mark (ml)	Measures except 50 ml (Squat)	50 ml (Squat) Measures
200, 180, 160	3.0	—
140, 120, 100	2.0	—
20, 80, 70, 60	1.5	—
50, 40	1.0	1.0
30	0.8	1.0
20	0.6	0.8
15	0.5	—
10, 9	0.4	—
8, 7, 6	0.3	0.6
5	0.25	—
4	0.20	—
3	0.16	—
2	0.12	—
1	0.08	—

Note.—The permissible errors, apart for those of the 50 ml (Squat) measure, apply to graduation marks corresponding to the capacities stated, irrespective of the nominal capacity of the conical measure concerned.

6. BEAKER MEASURES:

(a) *Shape.*—The measure shall be in the form shown in Fig. 2-A and 2-B.

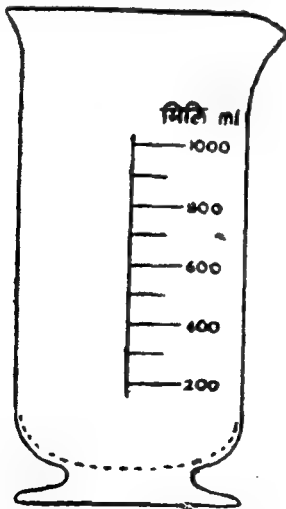


Fig. 2-A.—1000 ml.

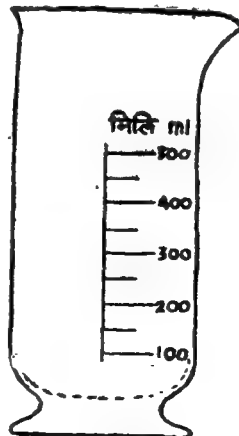


Fig. 2-B.—500 ml.

Fig. 2.—Beaker Measures.

(b) *Construction.*—(i) Each measure shall be provided with a pouring lip. The form of the lip shall be such that, when the measure is filled with water to the highest graduation mark, the contents may be poured from the lip in a stream falling clear of the outside of the measure.

(ii) Each measure shall be provided with a base on which it shall stand vertically without rocking when placed on a horizontal surface. The size of the base shall be such that the measure, when empty, shall not fall when, placed on a plane inclined at 15° to the horizontal. The bottom of the measuring space shall be uniformly rounded and shall merge smoothly into the sides of the measure.

(iii) The overall volume of the measure shall be such that when the measure is filled with water to the highest graduation mark and a volume of water equal to quarter the denomination volume is added to it, the water shall not overflow.

(c) *Graduation.*—(i) The graduation marks shall be marked as shown in Fig. 2-A and 2-B and Table 3. The marks shall be etched or engraved and shall be of a uniform thickness not exceeding 0.3 mm, provided that they may taper slightly towards the ends. The graduation marks shall lie in planes perpendicular to the axis of the measure and shall be horizontal when the measure is standing on a horizontal surface.

(ii) Each graduation number shall be etched or engraved close to the end of the graduation mark to which it relates and in such a manner that it would be bisected by a prolongation of that graduation marks.

(iii) The distance between the highest and the lowest graduation marks at the height of the lowest graduation mark above the inside of the base of the measure shall be in accordance with columns (3) and (4) respectively of Table 3.

TABLE 3—GRADUATION AND DIMENSIONS OF BEAKER MEASURES

Denomi- nations	Graduation at	Distance between lowest and highest gradua- tion marks	Height of lowest gradua- tion mark above bottom of measur- ing surface	Diameter of top	Mini- mum diami- ter of base	Over- all height
1	2	3	4	*5	*6	*7
ml		cm	cm	cm	cm	cm
1000	200 to 1000 ml at each 100 ml; numbered at each 200 ml; unnumbered back lines at 200, 600 and 1000 ml.	11 ± 1	4 ± 1	12	9	23
500	100 to 500 ml at each 50 ml; numbered at each 100 ml, unnumbered back lines at 100, 300 and 500.	9 ± 0.5	3 ± 0.5	10	8	18

*These are only recommendatory.

(d) *Permissible errors.*—The permissible errors in excess or in deficiency for verification or inspection shall not exceed 7 ml for 1,000 ml measure and 5 ml for 500 ml measure.

7. MARKING:

Each measure shall have permanently and legible engraved or etched on its denomination in Indo-Arabic numerals, the abbreviations “ml” and “मिलि” being used to indicate millilitres. The manufacturer’s name or trade mark shall be marked on the underside of the base of each measure.

PART VI—SPECIAL MEASURES FOR LIQUOR

1. GENERAL:

This part deals with special measures which may be used in transactions in liquor.

2. BEAKER MEASURES:

(a) *Material.*—The measure shall be made of glass.

(b) *Denomination and graduation.*—It shall be of the denomination of 300 ml. It shall have graduation marks at 100 ml, 120 ml, 150 ml, 180 ml, 200 ml, 250 ml and 300 ml.

(c) *Permissible errors.*—The permissible errors shall be as follows:—

<i>Graduation marks</i>	<i>Maximum permissible error</i>
100 ml, 120 ml	± 2 ml
150 ml, 180 ml, 200 ml, 250 ml and 300 ml	± 3 ml

3. PEG MEASURES:

(a) Peg measures may be of the denominations 60 ml and 30 ml.

(b) *Permissible errors.*—The permissible errors shall be as follows:—

<i>Capacity</i>	<i>Maximum permissible error</i>
60 ml	± 2 ml
30 ml	± 1 ml

PART VII—COMMERCIAL LENGTH MEASURES (NON-FLEXIBLE)

1. GENERAL:

This part deals with the non-flexible type of commercial length measures made of metal or wood.

2. DENOMINATIONS:

The denominations of the length measures shall be as follows:—

<i>Metallic measures</i>	<i>Wooden measures</i>
1m	2m
0.5 m	1 m
	0.5 m

3. METALLIC MEASURES:

(a) *Materials.*—The measures shall be made from mild steel or brass plated with nickel and chromium or from stainless steel.

(b) *Shape and dimensions.*—The shape and dimensions of the measures shall be as shown in Fig. 1.

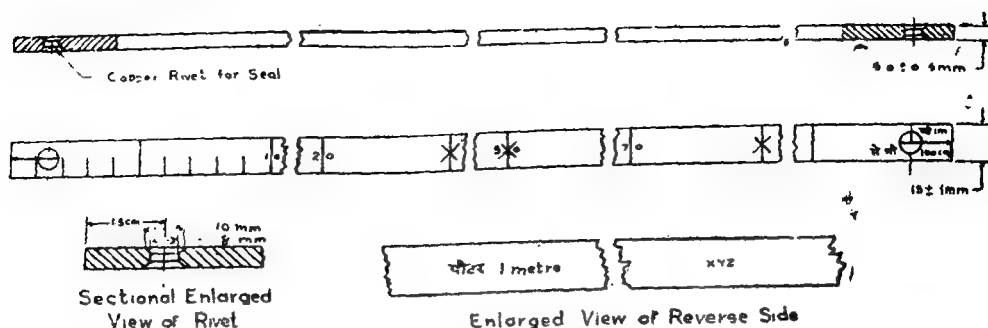


Fig. 1.—Metallic Measure

(c) *Graduation.*—(i) The graduation marks shall be made at every centimetre, or at every centimetres for the first ten centimetres and thereafter at every five centimetres. The graduation marks at every ten centimetres shall be numbered. The marks at the centimetre divisions shall extend over half the breadth and those at five centimetre divisions over full breadth of the measures. A cross mark shall be provided at 25 centimetres in the case of 0.5 m measures and at 25, 50 and 75 cm in the case of 1 m measures (See Fig. 1).

(ii) The graduation shall be only on one side of the measure.

(d) *Permissible errors.*—The mark at every five centimetre shall not exceed or be deficient by more than 0.25 mm, and further the error from the beginning of the measure to any line mark shall not exceed 1.0 mm, always provided that the errors on the full length of the measure shall not exceed the following limits:—

Denomination		Verification		Inspection	
		Excess 2	Deficiency 3	Excess 4	Deficiency 5
1 m	..	1.0 mm	0.5 mm	1.0 mm	1.0 mm
0.5 m	..	0.5 mm	0.25 mm	0.5 mm	0.5 mm

(e) *Provision for stamping.*—The measures shall be provided with a copper rivet near each end (See Fig. 1) firmly fixed in the hole, countersunk on both sides, for the Inspector's stamp. An arrow head shall be marked at each end of the measure to provide the points for checking the length.

4. WOODEN MEASURES:

(a) *Materials.*—The measure shall be made from well seasoned timber of any one of the following species:—

- teak (*Tectona gradis* Linn. f),
- rosewood (*Dalbergia Latifolia* Roxb.),
- shisham (*Dalbergia sissoo* Roxb.),
- haldu (*Adhina cordifolia* Hook. f),
- bijasal (*Pterocarpus maruspium* Roxb.),
- boxwood (*Buxux sempervirens*),
- beech (*Fagus sylvatica*).

(b) *Shape and dimensions.*—The shape and dimensions of the measures shall be as shown in Fig. 2.

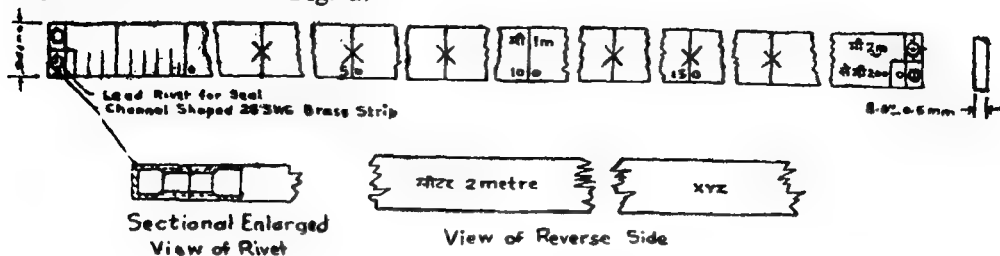


Fig. 2.—Wooden Measure

(c) *Graduation.*—The graduation marks shall be made at every centimetre or at every centimetre for the first ten centimetres and thereafter at every five centimetres. The graduation marks at every ten centimetres shall be numbered. The marks at the centimetre divisions shall extend over half the breadth and those at the five centimetre divisions over the full breadth of the measures. A cross mark shall be provided at every 25 cm excluding the one metre and two metre graduations (See Fig. 2).

The graduation shall be on one side of the measures only.

(d) *Permissible errors.*—The mark at every five centimetres shall not exceed or be deficient by more than 1 mm, and further the error from the beginning of the measure to any line mark shall not exceed 2 mm, always provided that the errors on the full length of the measure shall not exceed the following limits:—

Denomination		Verification		Inspection	
		Excess	Deficiency	Excess	Deficiency
2 m	..	4 mm	2 mm	4 mm	4 mm
1 m	..	2 mm	1 mm	2 mm	2 mm
0.5 m	..	1 mm	0.5 mm	1 mm	1 mm

(e) *Provision for stamping.*—Each measure shall be provided at each end with a metal tip not less than 1 cm in width, securely riveted with two rivets at each end, as shown in Fig. 2, for receiving the Inspector's stamp. The width of the tips shall be included in the total length of the measure.

5. MANUFACTURE AND FINISH:

(a) The measure shall be evenly finished and shall be reasonably straight.

(b) In the case of metallic measures, the graduation marks and the cross marks shall be legible and deep enough to ensure indelibility over a reasonably long period of use, but not so deep as to make the measures liable to be easily bent. In the case of wooden measures, the markings shall be finished neatly, sharply and legibly, in a colour contrasting with the wood finish. They shall be visible from distance and shall remain indelible over a reasonably long period of use.

6. MARKINGS:

(i) The denomination shall be stamped on the ungraduated side of the measure at about one-third of the total length from the beginning of the measure and the manufacturer's name or trade mark at a similar distance

from the end of the measure. In case of wooden measures, the marking shall be finished in the same manner as the graduation.

(ii) The denomination shall be given in Indo-Arabic numerals preceded by the word "मीटर" and succeeded by the word "metre". The size of numerals and letters, indicating denominations of the measures, shall be twice that of the letters indicating the manufacturer's name or trade mark.

PART VIII—COMMERCIAL FOLDING SCALES

1. GENERAL:

This part deals with wooden folding scales.

2. DENOMINATIONS:

The denominations of folding scale shall be:

1m and 0.5 m.

3. MATERIALS:

(a) The scales shall be made from strips or sheets of wood. They shall be uniform in width and thickness throughout the entire length.

(b) The scales shall be made of any one of the following species of timbers:—

- (i) Boxwood (*Buxus sempervirens*),
- (ii) Gardenia (*Gardenia* sp.),
- (iii) Parrotia (*Parrotia Jacquemontiana*)/*Randhia Dumetorum*,
- (iv) Dudhi (*Wrightia* sp.),
- (v) Bamboo,
- (vi) Haldu (*Adina cordifolia*, Hook. f.),
- (vii) Kalam (*Mitragyna parvifolia* Korth),
- (viii) Kuthan (*Hymenodictyon excelsum* Wall),
- (ix) Gamari (*Gmelina arborea* Linn).

(c) The timber shall be thoroughly seasoned and radially sawn. The moisture content of the timber shall be between 8 and 12 per cent. The timber shall be free from knots, cracks, sap wood, shakes and other visible defects such as decay, insect attack, etc., and shall be fairly straight-grained.

4. MANUFACTURE:

(a) *General*.—The scales shall be straight and flat, the edges parallel to each other and the ends square.

(b) No point on any of the edges shall be more than 0.5 mm distant from the straight line connecting its extremities. No point on the surface of a scale shall be more than 0.5 mm distant from the plane of the surface.

(c) The scales shall consist of four pieces hinged together and it shall be an end measuring scale. The joints shall work smoothly without undue play and shall be sufficiently free from the folds to be opened and closed without strain. The brass caps shall be closely fitted and strongly secured to the blades. They shall be made flush with the sides of the scales.

5. DIMENSIONS:

(a) The principal dimensions of the scale of blanks shall be as follows:—

Length of graduated part (m)	Overall length		Width		Thickness mm
	Max. (mm)	Min. (mm)	Max. (mm)	Min. (mm)	
0.5	500	—	15.0	14.5	4±1
1	1000	—	20.0	19.0	5±1

6. GRADUATIONS:

(a) Graduation marks shall be made at every millimetre with a longer line at every 5 mm and centimetre. The length of the graduation lines shall be as follows:—

cm marks	6 mm
5 mm marks	4 mm
1 mm mark	2.5 mm

(b) The lines shall be fine and clear, of uniform depth and thickness, and perpendicular to the edges. The thickness of lines shall be not more than 0.2 mm for stamped scales and 0.1 mm for engine divided scales. The lines shall be of sufficient depth to be legible and indelible.

(c) The lines shall be filled in black on natural background or with a suitable colour which shall contrast with the colour of the base to ensure legibility.

(d) Every centimetre shall be numbered in Indo-Arabic numerals. The height of the figures shall be between 2.0 and 2.5 mm.

7. PERMISSIBLE ERROR:

The cumulative error for the entire graduated part shall not exceed ± 0.50 mm. Further, over any 10 cm length of scale, the error shall not exceed ± 0.25 mm.

8. MARKING:

(a) The denomination shall be stamped on the ungraduated side of the measure at a distance about one-third of the total length from the beginning of the measure. The manufacturer's name or trade mark shall be marked at the same distance from the end of the measure. They shall be finished in the same manner as the graduations.

(b) The denomination shall be given in Indo-Arabic numerals preceded by the word "मीटर" and succeeded by the word "metre". The size of numerals and letters, indicating denominations of the measures shall be twice that of the letters indicating the manufacturer's name or trade mark.

9. PROVISION FOR STAMPING:

The measure shall receive the Inspector's stamp either on the metal strip at the ends or the central hinge as may be convenient.

PART IX—WOVEN METALLIC TAPE MEASURE:

1. Woven metallic tape measures may be used where the use of rigid measures is not convenient or practicable.

2. DENOMINATIONS:

The tape measures shall be made in lengths of 2, 5, 10, 15, 20, 30 and 50 metres.

3. TAPE:

(a) *Materials.*—(i) The tape shall be of yarn and metal wire in the warp and only yarn in the weft.

(ii) The yarn shall be spun from good quality cotton or linen and shall be either bleached or mercerized. The yarn used shall be of 20 count (17 French count) in the warp and 40 count (34 French count) in the weft.

(iii) The wire shall be of phosphor bronze, copper or stainless steel and shall be 0.16 mm in diameter.

(b) *Weave*.—(i) The weave shall be either plain, that is one up and one down, or dosuti that is two up and two down with at least eight wires uniformly spaced in the warp.

(ii) The total number of warp threads, including wire threads, shall be in the full width of the tape. The picks per centimetre shall be 16 in the case of cotton yarn and 13 in the case of linen yarn.

4. MANUFACTURE:

(a) The tape shall be coated with a suitable primer of synthetic material over which one or more coats of flexible, high quality enamel shall be given. The final top coat shall be of a varnish which shall give the tape a good finish. All coatings shall be non-cracking and water resistant.

(b) A metal ring shall be attached to the outer end of tapes of denominations 10, 15, 20, 30 and 50 metres, the ring being fastened to the tape by a metal strip of the same width as the tape for protection and for receiving the Inspector's stamp (See Fig. 1).

(c) (i) The outer end of tapes of denominations 10, 15, 20, 30 and 50 metres shall be reinforced over a length of not less than 10 cm by a strip of leather or suitable plastic material of the same width as the tape. The leather or plastic strip shall also pass around the ring and under the metal strip (See Fig. 1).

(ii) Tapes of 2 and 5 metre denominations shall be reinforced over a length of not less than 10 cm by a strip of cotton fabric or suitable plastic material, over which a strip of brass or any other suitable material is rigidly fixed for protection and for receiving the Inspector's stamp (See Fig. 2).



Fig. 1.—Woven Metallic Tape Measures—10, 15, 20, 30 and 50 metres

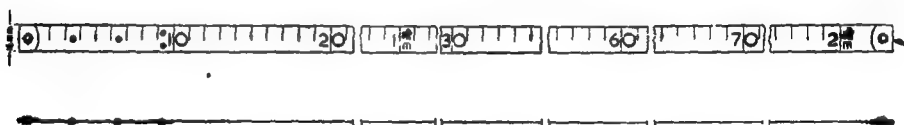


Fig. 2.—Woven Metallic Tape Measures—2 and 5 metres

5. GRADUATION:

(a) The length of the tape shall include the metal finger ring, when provided.

(b) At every centimetre a black line, 8 to 10 mm in height shall be drawn and every five centimetres shall be marked with an arrow in black. Every 10th cm and every metre shall be marked with a black line extending over the full width of the tape (i.e. 16 mm). The graduation marks at every 10th cm and every metre shall be numbered with black and red figures, respectively. The metre markings shall in addition, contain the letters 'मी' and 'm' and the end of the tape shall be marked 'मीटर' and 'metre'. The graduations shall be only on one side of the tapes.

(c) *Permissible errors*.—The errors in the length of the tape when supported on a horizontal surface, under a tension of one kilogram, shall not exceed the following both during verification and inspection:—

<i>Denomination</i>	<i>Permissible errors</i>
m	mm
2	+1.5
5	+3.0
10	+5.0
15	+7.5
20	+10.0
30	+15.0
50	+20.0

In addition, the case of 20, 30 and 50 metre tapes, the errors from the beginning of the tape to the lengths specified below shall not exceed the following limits:—

<i>Length</i>	<i>Permissible errors</i>
m	mm
10	+10
15	+12.5
20	+15
30	+20

6. MARKINGS:

On the ungraduated side and also on the case of each tape when provided, the name of the manufacturer or his registered trade mark and the denomination shall be legibly marked in English or Devnagri or in both.

7. PROVISION FOR STAMPING:

Measures shall be stamped on the metal strip at the beginning of the scale on the graduated side.

PART X—METRIC STEEL TAPE MEASURES (WINDING TYPE)

1. DENOMINATIONS:

The denominations of the tape measures shall be 1, 2, 10, 15, 20, 30 and 50 metres.

2. TAPE:

(a) Tapes shall be of steel or stainless steel and may be of the following dimensions:—

<i>Width</i>	<i>Tolerance</i>	<i>Corresponding thickness</i>	<i>Tolerance</i>
mm	mm	mm	mm
16.0	+0.05	0.40	+0.05
13.0		0.40	
9.5		0.40	
6.0		0.15	

(b) The tape shall be of such a quality that when it is wound once round a rod of the diameter indicated below and then released, there shall be no permanent deformation in the tape:—

<i>Thickness of Tape</i>	<i>Diameter of Rod</i>
mm	mm
0.15	12
0.40	25

(c) The tapes of widths 16.0, 13.0 and 9.5 mm shall be curved or flat, tapes of 6.0 mm width shall be flat.

(d) The edges of the tapes shall be slightly rounded. The tapes shall be well polished or provided with a rust-proof coating and shall be free from burrs.

(e) The outer end of the tapes shall be provided with a ring or other device for facilitating withdrawal. The ring or other device shall be fastened to the tape by a metal strip of the same width as the tape.

3. GRADUATIONS:

(a) The length of the tape shall include the metal finger ring, when provided.

(b) The tape shall be graduated at intervals of 1 mm along the first 10 cm of its length and at intervals of 5 mm over the remaining part. The height of the graduation marks shall be as follows:—

Unit		Minimum height of marking mm
Millimetre	..	2
Five millimetres	..	3
Centimetre	..	4
Metre	..	Full width of the tape.

(c) Every 10 cm and metre shall be marked with Indo-Arabic numerals in bold type. The metre divisions shall, in addition, bear the designation “मी” and “m”. Every centimetre in the first 10th centimetre shall also be marked with Indo-Arabic numerals. The end of the tape measures of denominations 10, 15, 20, 30 and 50 metres shall be marked with the word “मी” and “metre” (See Fig. 1).



A = 16.0, 13.0, 9.5 OR 6.0 mm

Fig. 1.—Metric Steel Tape Measures (Winding Type) 10, 15, 20, 30 and 50 metres.

4. PERMISSIBLE ERRORS:

(a) When checked against a working standard, the error in the length of the tape, supported on a horizontal surface with a tension of 2 kg in the case of 1 and 2 metre lengths and 5 kg in the case of 10, 15, 20, 30 and 50 metre lengths, shall not exceed the following limits:—

(i) the errors between any two adjacent millimetre lines or between consecutive centimetre lines shall not exceed ± 0.2 mm. The error between consecutive 10th cm lines or consecutive metre lines shall not exceed ± 0.4 mm, and

(ii) when measured from zero to the points specified below, the error in the length of the tape shall not exceed the following limits:—

(i) 1 metre mark .. ± 0.4 mm

(ii) 2 metre mark .. ± 0.6 mm

(iii) 5 metre mark .. ± 1.0 mm

(iv) Any metre mark beyond the first 5 metres .. ± 1.0 mm for the first 5 metres
 ± 0.5 mm for additional 5 metres or part thereof).

(b) The permissible errors are the same for verification and inspection.

5. MARKING:

On the ungraduated side and on the case of each tape, the name or trade mark of the manufacturer and the denomination shall be legibly marked in English or Devnagri or in both, in addition, the direction of winding shall also be legibly marked on the case.

6. PROVISION FOR STAMPING:

Measures shall be stamped near the beginning of the scale on the graduated side.

PART XI—SURVEYING CHAINS

1. GENERAL:

This part prescribes the requirements for link type surveying chains of 20 and 30 m lengths for land measurements.

2. DEFINITIONS:

(a) *Surveying Chain*.—An instrument for measuring the surface distance between two points.

(b) *Length of Chain*.—The distance between the outside surfaces of the handles when fully stretched.

(c) *Tallies*.—Metallic tags or indicators of distinctive pattern fixed at various points of the chain, to facilitate quick reading of fractions of a chain.

3. MATERIAL:

The different components of the chain shall be made from the materials mentioned against each:—

<i>Component</i>	<i>Material</i>
Handle	.. Brass castings
Eye Bolt Collar	.. Brass suitable for free cutting and high speed machine work.
Ring	
Link, Small	.. Galvanised mild steel wire 4.00 mm
Link, Large	..
Link, connecting tally	.. Brass sheet or galvanised sheets
Indicating Ring	.. Brass wire

4. CONSTRUCTIONAL DETAILS:

(a) The nomenclature of the different parts of the chain and their dimensions shall be as indicated in Fig. 1, 2 and 3.

(b) Tallies shall be fixed at every fifth metre along the chain. Small rings shall be fixed at every metre, except where tallies are attached. The tallies shall have distinctive shapes depending on their position in the chain as shown in Fig. 1 and 2.

(c) Connecting links between two large links shall be oval in shape, the central one being a circular ring.

(d) To facilitate holding the arrows (chain pins) in position with the handle of the chain, a groove shall be cut on the outside surface of the handle as shown in Fig. 3. The radius of the groove shall correspond to the radius of the arrows.

(e) The handle joint shall have flexibility in order that it may be possible to swivel the handle round the eye bolt. A swivel may also be provided at the middle of the chain.

5. PERMISSIBLE ERRORS:

(a) When measured with a tension of 8 kg every metre length shall be accurate with an error not exceeding ± 2 mm. The overall length of the chains shall be accurate within the following limits of error:—

20 metre chain .. ± 5 mm

30 metre chain .. ± 8 mm

(b) The permissible errors shall be the same for verification and inspection.

6. MARKING:

(a) The tallies used for marking the distance in a chain shall be marked with letter "मी" and "m" (See Fig. 3).

(b) The length to the chain, 20 m, or 30 m, as the case may be, shall be indelibly marked over handle (See Fig. 3) to indicate the length.

(c) The chains shall be indelibly marked, on the reverse side of the surface of the handle having the denominations of the manufacturer's name, or trade mark.

7. PROVISION FOR STAMPING:

A metal label or disc shall be permanently attached to the handle at the beginning of each chain for the Inspector's stamp.

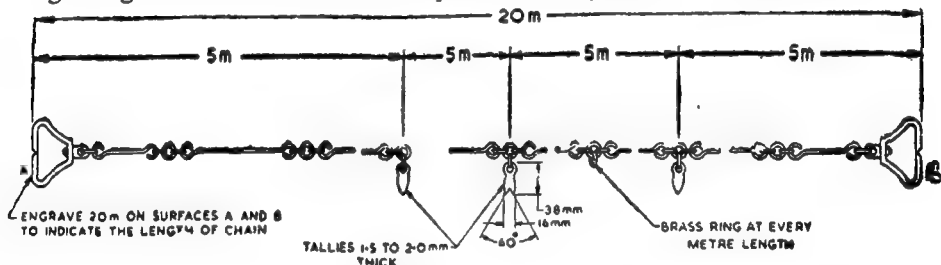


Fig. 1.—20-Metre Chain

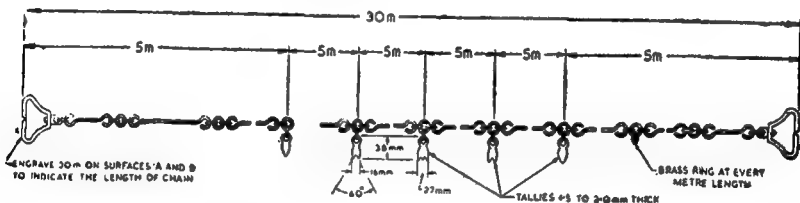


Fig. 2.—30-Metre Chain

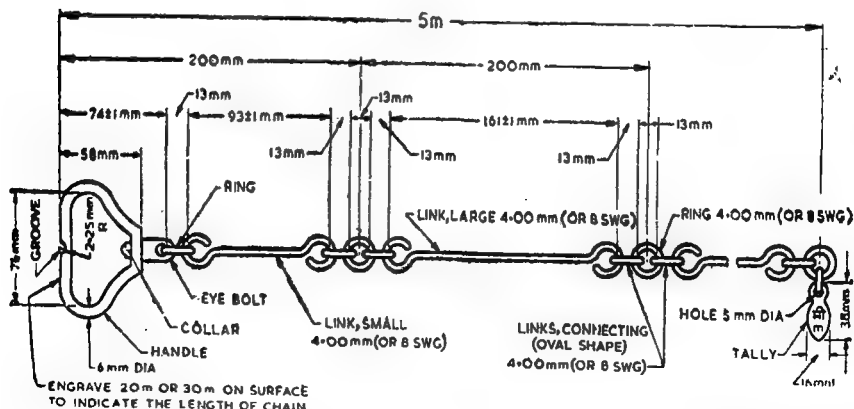


Fig. 3.—Nomenclature and details of 5m length at the beginning and end of Surveying Chain.

SCHEDULE VI

(See rule 10)

SPECIFICATIONS FOR COMMERCIAL WEIGHING INSTRUMENTS

PART I—GENERAL REQUIREMENTS

1. Weighing instruments of the following categories are included in these specifications:—

- (a) Beam Scales,
- (b) Counter Machines,
- (c) Steel-yards,
- (d) Platform Weighing Machines,
- (e) Weighbridges,
- (f) Spring Balances,
- (g) Crane Weighing Machines,
- (h) Automatic Weighing Machines,
- (i) Self-indicating and Semi-self-indicating Counter Type Machines,
- (j) Person Weighing Machines.

2. (a) Weighing instruments shall be of such materials, design and construction that, under normal conditions of service:

- (i) They maintain accuracy.
- (ii) They function satisfactorily without the need for frequent adjustments.
- (iii) Excessive stresses do not develop in the vital parts.

(b) All weighing instruments having steelyards shall be of, what is commonly known as, the vibrating type.

(c) A vibrating type of instrument is an instrument which has its indicator oscillating on either side of the position of equilibrium.

(d) Weighing instruments shall be of good workmanship and finish.

(e) Weighing instruments having assembly parts, without which the accuracy of the instrument is affected, shall be so constructed that it is not possible to use the instrument without these parts. They shall be suitably identified with the weighing instruments of which they form essential components.

(f) Where an instrument has interexchangeable or reversible parts the interchange or reversal of such parts shall not affect the accuracy of the instrument.

(g) All graduations in weighing instruments shall consist of notches or uniform lines, sharply defined, which may be painted, printed, incised or embossed so that the position of all pointers or sliding poises is clearly readable. All numbered graduations and their sub-divisions shall be marked by lines longer than the minor graduations. The minimum width part of graduations on steelyards shall be not less than 1.5 mm of capacities below 3000 kg and 3 mm for capacities of 3000 kg and above.

(h) *Knife-Edges and Bearings*.—The knife-edges and bearings shall be of agate or suitable hard material or of suitable quality steel. The steel knife-edges and bearings shall have the hardness specified below:

(i) For beam scales of classes C and D and with 54 Rc. minimum capacities 10 kg and below.

(ii) For other weighing instruments 60 to 66 Rc.

(i) The knife-edges and bearings shall be replaceable wherever practicable.

(j) Knife-edges and bearings shall be accurately and firmly secured preferably by hanks and nuts, or by bolts and nuts or by set-screws. The knife-edges and bearings shall be protected against corrosion and dirt.

(k) Racks and pinions shall be of suitable hardwearing material and shall be finished smooth.

(l) In the case of weighing instruments having steelyards, the nib shall remain secure in the notch.

(m) The knife-edge shall bear upon practically the whole length of the bearings.

3. MARKING:

(a) All weighing machines shall be prominently, legibly and indelibly marked with the maker's name or his registered trade mark, model, capacity and class (wherever applicable).

Note.—The manufacturer's name or the registered trade mark shall be such as will not be mistaken for the stamp or the seal of the verification authority.

(b) Weighing instruments shall have inscribed on them their maximum weighing capacity in the following manner:—

To weigh....., 'kg' or 'g' as appropriate.

(c) All numerals appearing on weighing instruments, beams, steelyards, dials etc., shall be Indo-Arabic numerals.

4. SEALING:

All weighing instruments shall be provided by the manufacturer with a plug or stud of soft metal to receive the stamp or seal of the verification authority. Such plug or stud shall be provided in a conspicuous part of the instrument and shall be made in such a manner as to prevent its removal without obliterating the seal.

5. TESTS:

(a) All weighing instruments shall be tested after they have been properly cleaned, and in the condition of their normal use, wherever practicable. Non-portable weighing instruments shall be tested *in situ* in addition to any other test that may be conducted at the premises of the manufacturer or dealer.

(b) Sensitiveness is the least weight which when added to or removed from the loading platform or pan when the machine is in equilibrium, will cause an appreciable movement of the indicator from its position of equilibrium.

Error is the least weight, which when added or removed will bring the indicator to the position of poise or equilibrium from its position of imbalance.

(c) Weighing instruments shall be tested for sensitiveness and maximum error:—

(i) The greatest error in excess on verification for graduations on the steelyard in the range corresponding to the first half of the capacity shall be not more than half the error allowed at full load; for graduations on the remaining part of the steelyard, the error shall be not more than the error prescribed at full load.

(ii) The greatest error in excess, on verification in the case of machine fitted with dial shall be half the weight represented by the interval between the consecutive graduation marks.

(iii) The permissible error in respect of graduations on machines fitted both with steelyard and dial shall be as prescribed above in (i) and (ii).

PART II.—BEAM SCALES

1. DEFINITIONS:

(a) A beam scale may be defined as a weighing instrument with equal arms, having three knife-edges, three bearings, an indicator (pointer) in

the centre, and pans suspended from the end of knife-edges (See Fig. 1).

(b) Sensitivity is the ratio between "change in mass" in one pan of the balance and the corresponding deflection of the beam or of the attached pointer produced by this change. Sensitivity may, therefore, be expressed as mg per division.

(c) Sensitiveness is the least weight which when added to or removed from the loading pan causes an appreciable movement of the indicator from its position of equilibrium.

(d) *Greatest error (due to inequality of arms).*—The greatest error is the weight required to bring the scale to equipoise with weights of equal mass placed on the two pans.

2. CLASSES:

(a) Beam scales may be of four classes A, B, C, and D depending on sensitivity or sensitiveness and greatest error specified in Table 1, 2, 3 and 4, respectively.

(b) The trades for which the different classes of scales may be used are—

Class of scale	Use
A	Commercial Assay and in Dharamkantas for verifying the weight of bullion and precious stones.
B	Precious stones, jewels, pearls, bullion, precious metals, saffron and similar expensive commodities, chemists and druggists preparations, perfumery.
C	Base metals and commodities such as cereals, tea, coffee; tobacco, jute, cotton, dry fruits, spices, oil seeds, etc.
D	Weighment of cheaper commodities such as scrap, iron, fuel-wood, charcoal, vegetables, etc.

3. CAPACITIES:

Beam scales of the different classes may be of the capacities shown in Tables 1, 2, 3 and 4.

4. MATERIALS:

(a) *Materials for Class A Beam Scales.*—Class A beam scales shall be made of non-magnetic materials only.

(b) *Materials for other classes of Beam Scales.*—(i) Beam shall be made of stainless steel, mild steel, brass, bronze or aluminium alloy.

(ii) Pan shall be made of stainless steel, mild steel, brass or bronze. The pans of class B beam scales may also be made of glass. In the case of beam scales of classes C and D, pans of hardwood shall be permitted, for capacities 100 kg and above. The pans of beam scales, when made of timber, shall be adequately reinforced with metallic plates and bands duly secured by bolts and nuts.

(iii) *Suspension.*—Pans shall be suspended from the beam by metal chains or metal stirrups; silk or nylon thread may also be used for class B scales of capacity 100 g and below.

(iv) All mild steel parts used in beam scales shall be suitably protected.

5. BEAM FITTINGS:

(a) The knife-edges and bearings used in beam scales shall be one of the following types:—

(i) *Agate-box.*—Wherein agate bearings are fitted in a brass or iron box, with side holes which permit the projecting ends of the knife-edges to pass into the boxes and rest on or rise to bearings (See Fig. 2).

(ii) *Dutch-end.*—Wherein the end bearings are fixed inside plates bolted together across the beam to form a shackle (See Fig. 3).

- (iii) *Swan-neck*.—Wherein the ends are curved and slotted, the bottom of the slot forming a knife-edge the extremities of the beam being widened in a direction at right angles to its length so that the base of the slot is parallel to the central knife-edge (See Fig. 4).
- (iv) *Continuous knife-edge*.—Where the knife-edges rest on the bearing along their whole length (See Fig. 5).

6. CONSTRUCTION:

(a) Class A beam scales shall be provided with a means for relieving the bearings and knife-edges.

(b) Every beam scale of class A shall be provided with a glass case. It shall also be provided with bubbles or a plumb line and levelling screws to facilitate levelling of the instrument.

(c) Beam scales of classes B, C and D shall have the leading dimensions specified in tables 5 to 9 and Fig. 6 to 10 as applicable.

(d) Class D beam scales shall be distinguished from class C scales by two holes of the same size (5 to 10 mm in diameter) through the beam, one on either side of the central knife-edge (See Fig. 10).

(e) The dimensions may vary within plus or minus 10 per cent of those prescribed in Tables 5 to 9.

(f) Beam scales of classes B, C and D and capacities 50 kg and above shall be provided with balance balls or balance boxes. The balance ball or balance box shall be securely attached to one of the suspension chains or pans in such a manner that it is not possible to tamper with it easily. The balance ball or balance box shall not be so large as to contain loose material of weight exceeding 1 per cent of the capacity for scales of capacity 50 kg or exceeding 1 kg for scale of higher capacity.

(g) Beam scales other than of class A shall not be provided with any attachment to adjust their sensitivity.

7. TESTS:

(a) *Sensitiveness*.—The scales shall be tested for sensitiveness at full load and shall comply with the requirements specified in Tables 1 to 4.

(b) *Inequality of Arms Test*.—(i) In the case of beam with fixed hooks, the beam with hooks but without chains and pans shall be brought to a position of equilibrium. If there are detachable hooks, the beam without the hooks shall be brought to equilibrium. Later the hooks may be attached and the beam again brought to equilibrium. The beam with hooks, chains and pans then brought to a position of equilibrium. It shall then be loaded with weights in both pans equal to the capacity of the scale and balanced. Where there is an attached hook, the chains and pans together with the loads in them shall be inter-changed and extra weight added to one of the pans to balance the beam.

(ii) In the case of beams with detachable hooks, the hooks, chains and pans together with the load thereon shall be inter-changed and the extra weight required to balance the beam noted. Half this extra weight shall not exceed the limits specified in Tables 1 to 4.

8. SEALING:

All beam scales shall be provided with a plug or plugs or stud or studs of soft metal to receive the stamp or seal of the verification authority. Such plug or plugs or stud or studs shall be provided in a conspicuous part of the scale and shall be made in such a manner as to prevent its removal without obliterating the seal or seals.

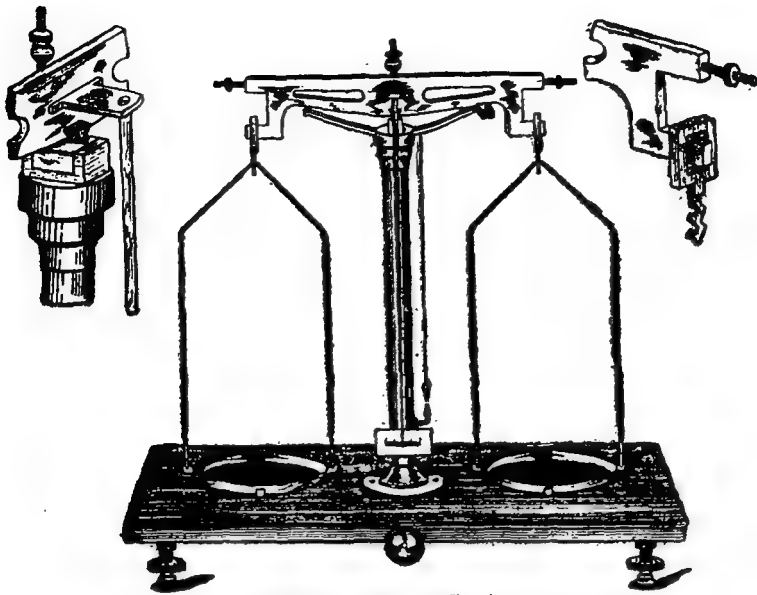


Fig. 1.—Beam Scale

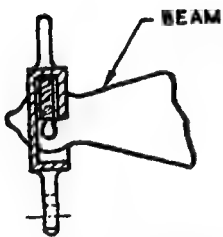


Fig. 2.—Agate Box

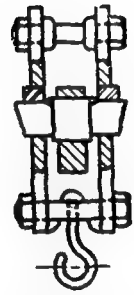
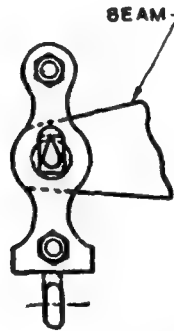
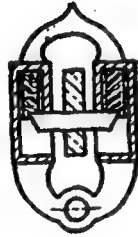


Fig. 3.—Dutch End



Fig. 4.—Swan Neck

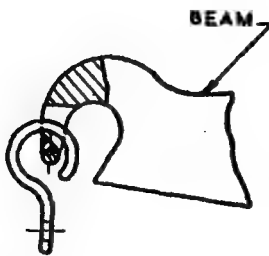
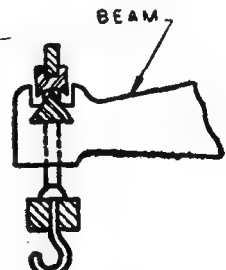


Fig. 5.—Continuous Knife-edge



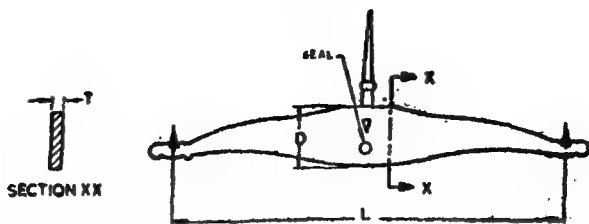


Fig. 6.—Beam, Class B (Flat Type)

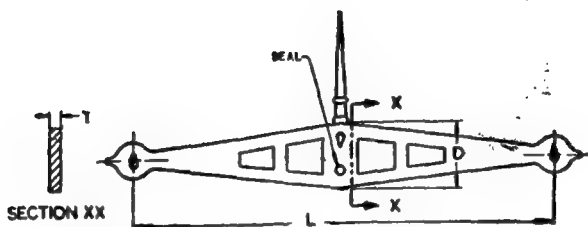


Fig. 7.—Beam, Class B (Open Pattern Type)

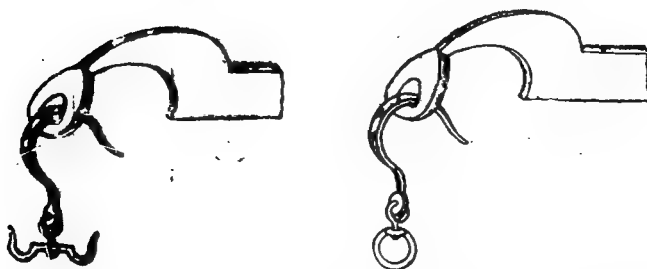
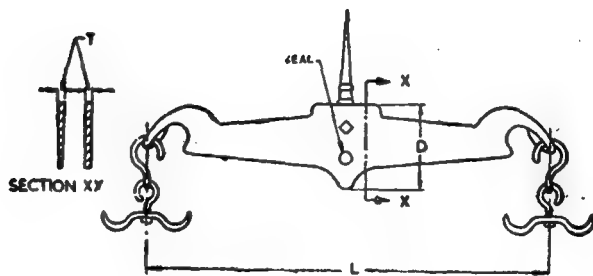


Fig. 8.—Beam, Class C (Swan Neck with separable Flat Hooks)

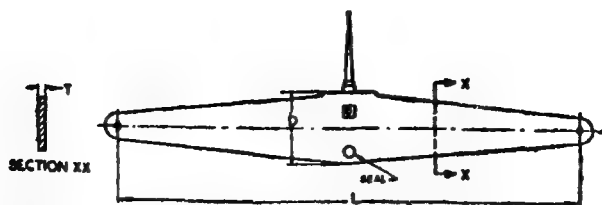
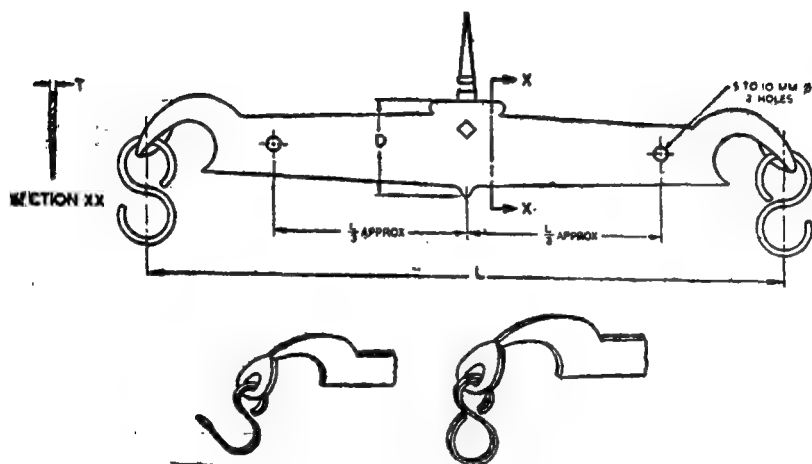


Fig. 9—Beam, Class C (Dutch End Type)



(Fig. 10—Beam, Class D (Swan Neck with fixed Flat Hooks))

TABLE 1—LIMITS FOR SENSITIVITY AND GREATEST ERRORS FOR BEAM SCALES

Class 'A'

Capacity	Verification		Inspection	
	Sensitivity per division of scale	Greatest error allowed when fully loaded	Sensitivity per division of scale	Greatest error allowed when fully loaded
1	2	3	4	5
2 g	0.02 mg	0.1 mg	0.06 mg	0.2 mg
10 g	0.05 mg	0.2 mg	0.15 mg	0.4 mg
20 g	0.10 mg	0.5 mg	0.30 mg	1.0 mg
50 g	0.20 mg	1.0 mg	0.60 mg	2.0 mg
200 g	0.50 mg	2.0 mg	1.50 mg	2.0 mg
1 kg	5.0 mg	20.0 mg	15.0 mg	40.0 mg
5 kg	10.0 mg	20.0 mg	30.0 mg	80.0 mg
20 kg	20.0 mg	80.0 mg	60.0 mg	160.0 mg
50 kg	50.0 mg	100.0 mg	150.0 mg	200.0 mg

TABLE 2—LIMITS FOR SENSITIVENESS AND GREATEST ERRORS FOR BEAM SCALES
Class 'B'

Capacity	Verification		Inspection	
	Sensitiveness when fully loaded	Greatest error allowed when fully loaded	Sensitiveness when fully loaded	Greatest error allowed when fully loaded
1	2	3	4	5
2 g	0.2 mg	0.4 mg	0.60 mg	0.8 mg
5 g	0.5 mg	1.0 mg	1.5 mg	2.0 mg
10 g	1.0 mg	2.0 mg	3.0 mg	4.0 mg
20 g	2.0 mg	4.0 mg	6.0 mg	8.0 mg
50 g	5.0 mg	10.0 mg	15.0 mg	20.0 mg
100 g	10.0 mg	20.0 mg	30.0 mg	40.0 mg
200 g	20.0 mg	40.0 mg	60.0 mg	80.0 mg
500 g	50.0 mg	100.0 mg	150.0 mg	200.0 mg
1 kg	100.0 mg	200.0 mg	300.0 mg	400.0 mg
2 kg	100.0 mg	200.0 mg	300.0 mg	400.0 mg
5 kg	250.0 mg	500.0 mg	750.0 mg	1.0 g
10 kg	500.0 mg	1.0 g	1.5 g	2.0 g
20 kg	1.0 g	2.0 g	3.0 g	4.0 g
50 kg	2.5 g	5.0 g	7.5 g	10.0 g
100 kg	5.0 g	10.0 g	15.0 g	20.0 g
200 kg	10.0 g	20.0 g	30.0 g	40.0 g

TABLE 3—LIMITS OF SENSITIVENESS AND GREATEST ERRORS FOR BEAM SCALES
Class 'C'

Capacity	Verification		Inspection	
	Sensitivity when fully loaded	Greatest error allowed when fully loaded	Sensitivity when fully loaded	Greatest error when fully loaded
1	2	3	4	5
100 g	100 mg	200 mg	300 mg	400 mg
200 g	200 mg	400 mg	600 mg	800 mg
500 g	500 mg	1.0 g	1.0 g	2.0 g
1 kg	1.0 g	2.0 g	3.0 g	4.0 g
2 kg	1.0 g	2.0 g	3.0 g	4.0 g
5 kg	2.5 g	5.0 g	7.5 g	10.0 g
10 kg	5.0 g	10.0 g	15.0 g	20.0 g
20 kg	10.0 g	20.0 g	30.0 g	40.0 g
50 kg	12.5 g	25.0 g	37.5 g	50.0 g
100 kg	25.0 g	50.0 g	75.0 g	100.0 g
200 kg	25.0 g	50.0 g	75.0 g	100.0 g
300 kg	37.5 g	75.0 g	112.5 g	150.0 g
500 kg	62.5 g	125.0 g	187.5 g	250.0 g
1000 kg	125.0 g	250.0 g	375.0 g	500.0 g

TABLE 4—LIMITS FOR SENSITIVENESS AND GREATEST ERRORS FOR BEAM SCALES

Class 'D'

Capacity	Verification		Inspection	
	Sensitiveness when fully loaded	Greatest error allowed when fully loaded	Sensitiveness when fully loaded	Greatest error allowed when fully loaded
1	2	3	4	5
1 kg	2.0 g	3.0 g	6.0 g	6.0 g
2 kg	2.0 g	3.0 g	6.0 g	6.0 g
5 kg	5.0 g	7.5 g	15.0 g	15.0 g
10 kg	10.0 g	15.0 g	30.0 g	30.0 g
20 kg	20.0 g	30.0 g	60.0 g	60.0 g
50 kg	25.0 g	37.5 g	75.0 g	75.0 g
100 kg	50.0 g	75.0 g	150.0 g	150.0 g
200 kg	50.0 g	75.0 g	150.0 g	150.0 g
300 kg	75.0 g	150.0 g	225.0 g	300.0 g
500 kg	125.0 g	250.0 g	375.0 g	500.0 g
1000 kg	250.0 g	500.0 g	750.0 g	1000.0 g

TABLE 5—LEADING DIMENSIONS OF BEAM FOR BEAM SCALES CLASS 'B'
(WITH POINTER ABOVE THE BEAM)

Capacity	Length between the ends (Nominal)	Depth at the centre (Nominal)	Thickness of plate at the centre (Nominal)
	L mm	D mm	T mm
1	2	3	4
(a) Flat type with Pointer above Beam			
2 g	70	3	2
5 g	95	3	2
10 g	110	4	2
20 g	120	20	3.15
50 g	135	22	3.15
100 g	150	25	4
200 g	170	25	5
500 g	200	30	5
1 kg	250	40	6
2 kg	300	45	6
5 kg	450	50	6
10 kg	500	58	8
20 kg	600	58	10
50 kg	750	100	15
100 kg	1000	110	18
200 kg	1250	125	25

1	2	3	4
(b) Open Pattern Bridge type with Pointer above Beam			
200 g	170	25	5
500 g	260	37	5
5 kg	310	44	5
2 kg	350	48	5
5 kg	450	60	6
10 kg	500	70	8
20 kg	600	80	10
50 kg	750	120	15
100 kg	1000	150	20

TABLE 6—LEADING DIMENSIONS OF BEAM FOR BEAM SCALES CLASS 'B' FLAT AND OPEN PATTERN TYPE WITH POINTER BELOW THE BEAM)

Capacity	Length between the ends (Nominal)	Depth at the centre (Nominal)	Thickness of plate at the centre knife-edge (Nominal)
1	L mm 2	D mm 3	T mm 4
2 g	70	3	2
5 g	95	3	2
10 g	110	4	2
20 g	120	20	3.15
50 g	135	20	3.15
100 g	150	20	4
200 g	200	20	6
500 g	235	25	8
1 kg	300	30	8
2 kg	320	30	9
5 kg	350	32	10
10 kg	400	40	12
20 kg	500	50	14
50 kg	700	70	18
100 kg	800	80	20
200 kg	1250	125	25

TABLE 7—LEADING DIMENSION FOR BEAM FOR BEAM SCALES CLASS 'C' (Swan Neck Type)

Capacity	Length between the ends (Nominal)	Depth at the centre (Nominal)	Thickness of plate at the centre knife-edge (Nominal)
1	L mm 2	D mm 3	T mm 4
100 g	150	30	4
200 g	200	40	5

1	2	3	4
500 g	300	40	6
1 kg	350	45	6
2 kg	400	45	6
5 kg	500	70	6
10 kg	600	80	6
20 kg	750	116	6
50 kg	900	108	8
100 kg	1200	154	14
200 kg	1350	138	16
300 kg	1650	148	18
500 kg	1800	178	25
1000 kg	2000	200	32

TABLE 8—LEADING DIMENSIONS OF BEAM FOR BEAM SCALES CLASS 'C'
(Dutch-end Type)

Capacity	Length between the end knife- edge (Nominal)	Depth at the centre (Nominal)	Thickness of plate at the centre knife- edge (Nominal)
1	L mm 2	D mm 3	T mm 4
100 g	150	35	4
200 g	200	40	5
500 g	300	40	6
1 kg	350	45	6
2 kg	400	45	6
5 kg	450	75	6
10 kg	450	70	8
20 kg	600	70	8
50 kg	750	80	8
100 kg	900	120	14
200 kg	900	133	16
300 kg	1050	142	16
500 kg	1350	192	20
1000 kg	1650	203	25

TABLE 9—LEADING DIMENSIONS OF BEAM FOR BEAM SCALES CLASS 'D'

Capacity	Length between end knife-edge (Nominal)	Depth at the centre (Nominal)	Thicknes of plate at the centre (Nominal)
1	L mm 2	D mm 3	T mm 4
(a) Swan-neck with fixed flat hooks			
1 kg	350	45	6
2 kg	400	45	6

1	2	3	4
5 kg	550	70	6
10 kg	600	80	6
20 kg	750	108	6
50 kg	900	116	8
100 kg	1200	138	14
200 kg	1350	148	16
300 kg	1650	154	18
(b) With detachable flat hooks			
500 kg	1800	178	25
1000 kg	2000	200	32

PART III—COUNTER MACHINES

1. DEFINITIONS:

A counter machine is an equal armed weighing instrument of capacity not exceeding 50 kg the pans of which are above the beam. Figure (1) illustrates a typical counter machine.

2. CAPACITIES:

The machine may be of the following maximum capacities:—
500 g, 1 kg, 2 kg, 3 kg, 5 kg, 10 kg, 15 kg, 20 kg, 25 kg and 50 kg.

3. GENERAL REQUIREMENTS:

(a) When the beam or body has two sides they shall be connected together by not less than two cross-bars. The supports for the pans shall be of a suitable rigid structure such as cross members strengthened by straps. Central pieces or forks shall be fixed so that they are not twisted or dislocated.

(b) Bearing surfaces, knife-edges and points of contact of all stays, hooks and loops shall be of hard steel or agate. The knife-edges and bearings shall be so fitted as to allow the beam to move freely. The knife-edge shall rest upon the bearings along the whole length of their working part.

(c) A counter machine may have a balance box for minor adjustments. In such a case, the balance box shall be permanently fixed beneath the weight pan and shall be large enough to contain loose material to an amount upto one per cent of the capacity of the machine. No other adjusting contrivance shall be used.

(d) The pans may be of any suitable material such as mild steel, stainless steel, brass or bronze. They may be of any convenient shape.

(e) The minimum fall either way, on counter machines shall be as follows:—

Capacity	Fall
500 g, 1 kg and 2 kg	.. 6 mm
3 kg, 5 kg, 10 kg, 15 kg	.. 10 mm
20 kg. and 25 kg	.. 12 mm
50 kg	.. 13 mm

4. TEST:

(a) The machines shall be tested on a horizontal level plane.

(b) *Sensitiveness and Error.*—(i) The machines shall be tested for sensitiveness at full load with the beam in horizontal position. The addition of the weight specified in columns 2 or 4 as the case may be, in Table 1 shall cause the pointer to rise or fall to the limit of its range of movement.

(ii) The error is the weight, if any, required to bring the beam of the instrument to a horizontal position when fully loaded with weights

equal to its capacity on both pans. It shall not exceed the limits specified in columns 3 and 5 as the case may be, of Table 1.

(c) The test for sensitiveness shall be carried out only with the pans loaded to the full capacity of the machine.

(d) When the goods pan is in the form of a scoop, the machine shall be correct to the prescribed limits of error if half the full load is placed against the middle of the back of the scoop and the other half at any position on the scoop.

(e) When the goods pan is not in the form of a scoop, the counter machines shall indicate the same weight within half the prescribed limits of error, if the centre of a load equal to half the capacity is placed on the goods pan anywhere within a distance from the centre equal to one-third of the greatest length of the pan, or if the pan has a vertical side against the middle of that side the weight being entirely on the weight pan, but in any position on it.

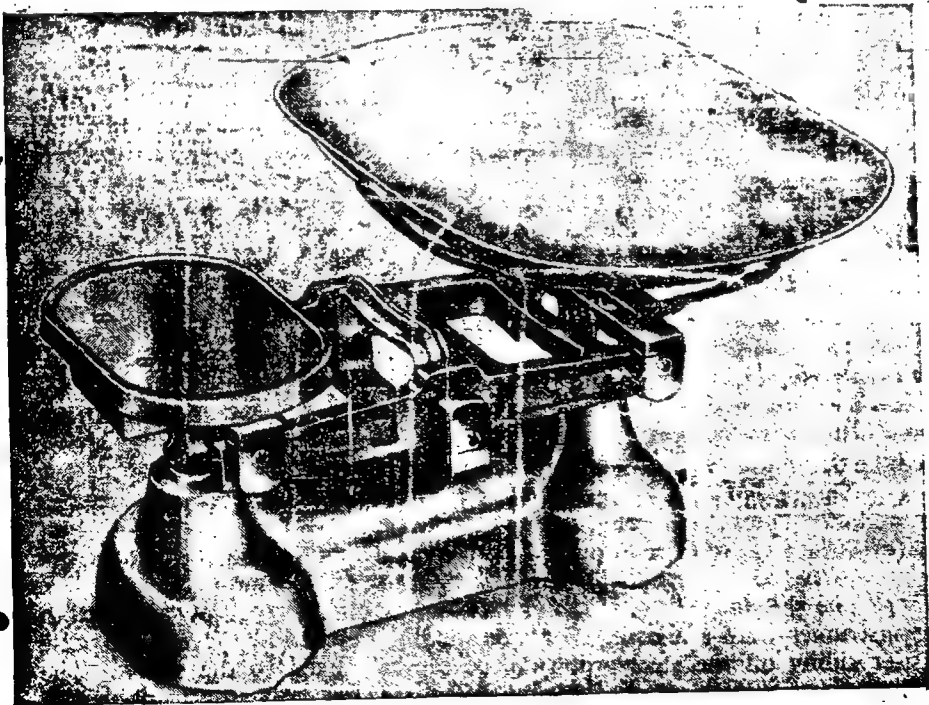


Fig. 1.—Counter Machine

TABLE 1—SENSITIVENESS AND ERRORS FOR COUNTER MACHINES

Capacity	Verification		Inspection	
	Sensitiveness when fully loaded	Greatest error allowed in excess or deficiency when fully loaded	Sensitiveness when fully loaded	Greatest error allowed in excess or deficiency when fully loaded
1	2	3	4	5
	g	g	g	g
500 g	1.5	2. 2	4.5	4.5
1 kg	2.0	3. 0	6.0	6.0
2 kg	3.0	4. 5	9.0	9.0
3 kg	4.0	6. 0	12.0	12.0
5 kg	6.0	9. 0	18.0	18.0
10 kg	7.0	10.05	21.0	21.0
15 kg	8.0	12. 0	24.0	24.0
20 kg	9.0	13. 5	27.0	27.0
25 kg	10.0	15. 0	30.0	30.0
50 kg	15.0	30. 0	45.0	60.0

5. SEALING:

Each machine shall be provided with a plug or stud of soft metal on a conspicuous part of the beam or body for receiving a seal. Such a plug or stud shall be made irremovable by under-cutting it or by some suitable method.

PART IV—STEELYARDS

1. DEFINITION:

A steelyard means an unequal armed balance.

2. CAPACITIES:

Steelyards may be of the following capacities:—

5 kg, 10 kg, 20 kg, 50 kg, 100 kg, 150 kg, 200 kg, 250 kg, 300 kg, 500 kg and 1000 kg.

3. DESIGN AND CONSTRUCTION:

- The general design of steelyard shall be as given in Fig. 1.
- Steelyards shall be made of either mild steel or stainless steel.
- The shank shall be perfectly straight but its cross-section need not necessarily be uniform throughout. Notches or graduations on the shank shall be cut in one plane and at right angles to the shank.

(d) The design of the sliding poise shall be such that the nib remains secure in the notch.

(e) Steelyards shall be provided with a stop or other suitable arrangement to prevent excessive oscillation of the shank.

(f) The sliding poise and suspending hooks shall be securely attached to the instrument. All end-fittings such as the nut attached to prevent the poise carrier riding off the steelyard, shall be securely fixed to the shank. The sliding poise shall be freely movable and there shall be a stop to prevent it from travelling behind the zero mark. Steelyards having counter poise or travelling poise shall be provided with a hole or other suitable means for the

future adjustment of the counter poise or travelling poise, such hole being under-cut. Wherever loose material is used in the travelling poise, it shall be securely enclosed.

(g) Steelyards shall be neither reversible nor have three hooks, and shall not be of counter type.

(h) Steelyards shall be provided with a vertical pointer directly above the fulcrum to indicate the true equilibrium.

(i) If a movable hook, tray, or bucket, is used it shall form an essential part of the steelyard without which it is not possible to balance the steelyard.

4. TESTS:

(a) Steelyards shall be tested at full load for sensitiveness and error, and shall comply with the requirements of Table 1.

(i) The test for sensitiveness shall be carried out at full load with the steelyard in horizontal position. The addition of the weight specified in column 2 or 4 of Table 1 shall make the steelyard turn.

(ii) The error or the weight, if any, required to bring the steelyard to a horizontal position when fully loaded shall not exceed the limits specified.

(b) Each numbered graduation shall be tested and the instrument shall be correct whether the test is carried out with increasing or decreasing loads.

(c) The intermediate graduations shall also be tested to see that they are correct and are at proper distance apart.

(d) No test for sensitiveness at a lower load shall be made.

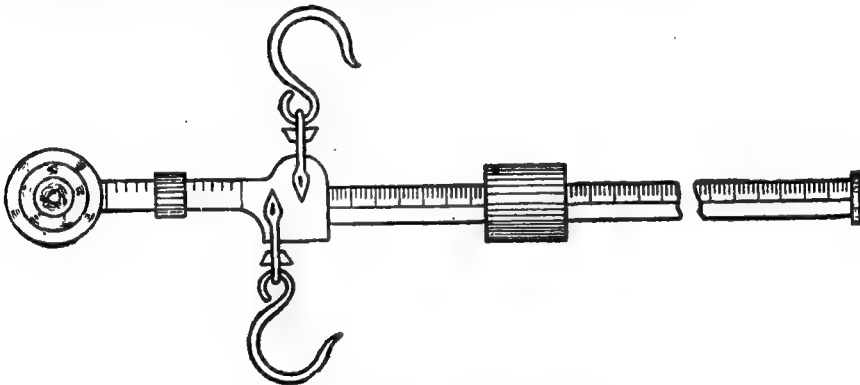


Fig. 1.—Steelyard

TABLE 1—SENSITIVENESS AND ERRORS FOR STEELYARDS

Capacity	Verification		Inspection	
	Sensitiveness when fully loaded	Greatest error allowed in excess or deficiency when fully loaded	Sensitiveness when fully loaded	Greatest error allowed in excess or deficiency when fully loaded
1	2	3	4	5
	g	g	g	g
5 kg	2.5	3.8	7.5	7.5
10 kg	5.0	7.5	15.0	15.0

1	2	3	4	5
	g	g	g	g
20 kg	10.0	15.0	30.0	30.0
50 kg	25.0	50.0	75.0	10.0
100 kg	40.0	80.0	120.0	160.0
150 kg	60.0	120.0	180.0	240.0
200 kg	80.0	160.0	240.0	320.0
250 kg	100.0	200.0	300.0	400.0
300 kg	120.0	240.0	360.0	480.0
500 kg	200.0	400.0	600.0	800.0
1000 kg	400.0	800.0	1200.0	1600.0

5. SEALING:

Each instrument shall be provided with a plug or stud of soft metal on the front face of the shoulder of the steelyard for receiving the seal of the verification authority. Such a plug or stud shall be made irremovable by under-cutting or by some other suitable method.

PART V—PLATFORM WEIGHING MACHINES

1. DEFINITION:

(a) A platform weighing machine means a weighing instrument with compound levers and with the goods receptacle generally in the form of a platform. The capacity of these machines shall not exceed 3 tonnes and the weight of the load is indicated with steelyard or other form of indicator.

(b) The nomenclature of a platform weighing machine is given in Fig. 1 which shows a "loose weight" type machine. In the case of "no-loose weight" type machine, there are two sliding poises, one for the major bar and the other for the minor bar of the steelyard.

2. CAPACITIES:

Platform weighing machines may be of the following capacities:—

50 kg, 100 kg, 150 kg, 200 kg, 250 kg, 300 kg, 500 kg, 1000 kg, 1500 kg, 2000 kg, and 3000 kg.

3. GENERAL REQUIREMENTS:

(a) *Steelyards.*—(i) The steelyard in the platform weighing machine shall not have any readily removable part except the support for proportional weights. There shall be one or more stops to prevent the sliding poise or poises from travelling behind the zero mark. The minimum travel of a steelyard in platform machines shall be 10 mm either way.

(ii) The top and bottom of the guide and/or steelyard shall be fitted with non-magnetic material.

(iii) When the steelyard is provided with notches, these shall be suitably protected.

(iv) The value of the smallest division on the minor bar shall not exceed the greatest error allowed for that capacity except for machines of capacities 200 kg and below in which case the value of the smallest division may exceed error prescribed for that capacity but shall not exceed 100 g.

(v) The value of the smallest graduation on dials or minor steelyards and wherever possible major steelyards shall be 1 g, 2 g, 5 g or any multiple by 10 or any power of 10 (for instance 100, 1000 etc.) of any of these weights.

(b) *Platform.*—(i) The permissible extension of the platform on either side of the box in the case of extended platform shall be not more than 25 per cent of the length of the box.

(ii) If a movable hutch, barrow, frame or bucket is used with the ordinary platform it shall form an essential part of the machine without which it is not possible to balance the machine. The movable hutch, barrow, frame or bucket shall be identified with the machine and when in position on the platform, it shall be as central as possible.

(c) *Balancing arrangement.*—(i) Where a balance box is provided on the steelyard, the balancing ball shall not be easily accessible.

(ii) The balancing arrangement for daily wear and tear shall have a range not exceeding 0.5 per cent of the capacity of the machines and not less than 0.125 per cent of the capacity each way (See Table 1). The balance box containing the balancing ball shall be securely attached to the steelyard preferably by passing a bolt through the casing to the steelyard. The balancing balls shall be actuated by a detachable key.

(d) In the case of platform machines provided with dials—

(i) the rack and pinions shall be suitable hard wearing material and shall be finished smooth;

(ii) the extremity of the pointer shall, in no position be at a greater distance than 5 mm from the graduated surface of the dial. Further, the extremity of the pointer shall be on the graduated portion of the dial, and it shall be so made as not to obscure the graduations or make them difficult to read; and

(iii) the dial shall be graduated into equal parts and the minimum width between the graduations shall be not less than 2 mm.

(e) The machine may, if required, have arrangement for marking up the tare.

(f) For machines without proportional weights, the total capacity shall be that indicated on the major steelyard.

4. PROPORTIONAL WEIGHTS:

(a) All loose proportional weights in a platform machine shall be identified with the machine by a number or any other suitable mark of identification, which shall be indelible. The counter-poise weights shall be marked with their equivalent weights as indicated in Fig. 2.

(b) The proportional weights shall be hexagonal in shape with a slot of suitable size to allow them being placed on the counter balance (See Fig. 2).

(c) The proportional weights shall be made of cast iron or brass.

(d) The proportional weights shall have one rectangular loading hole which shall be under-cut or tapering outwards so as to hold lead securely for adjustments. The under-cut hole shall be reasonably large to accommodate the lead required for adjustments. The surface of the lead in the loading hole of a new proportional weight shall be at least 3 mm inside from the bottom surface of the weight.

(e) In the case of platform machines provided with proportional weights the smallest denomination of the proportional weights shall be equivalent to the weights represented by the maximum graduation on the steelyard.

(f) The denomination of the proportional weights shall be 1 kg, 2 kg, 5 kg or a multiple or sub-multiple by 10 or a power of 10 (100, 1000 etc.) of

any of these weights. Any number of proportional weights in any one of the aforesaid denominations may be included provided the total of all the proportional weights does not exceed the capacity of the weighing instrument.

Note.—While arriving at the capacity of the platform machines, the maximum graduation shown on the steelyard in the case of loose-weights platform machines and on the minor bar in the case of “no-loose weight” type machines shall not be taken into account.

(g) The total capacity of the machine shall include the capacity of graduated tare bar or bars wherever provided.

Note.—When the tare bars are used and are not graduated except with a zero mark only, they shall not be taken into account when calculating the capacity of the machines. Ungraduated tare bars shall be marked with zero.

5. TESTS AND TEST REQUIREMENTS:

(a) The steelyard of platform weighing machine shall remain horizontal at no-load.

(b) Platform weighing machines shall be tested to verify the accuracy of graduations or notches upto the total capacity.

(c) All loose proportional weights, where these are provided, shall be tested and then suitably sealed to prevent tampering.

(d) With one quarter of the maximum load (or as near thereto as practicable) placed in the middle or at any of the corners of the platform, the platform weighing machine shall show the correct weight within half the limits of error prescribed in Table 2 in column 3 for non-dial type machines and in column 4 for dial type machines.

(e) Platform weighing machines with steelyard arrangement shall be tested for sensitiveness and error at full load or as near to its as practicable. The sensitiveness and permissible error shall not exceed the limits prescribed in columns 2 and 3 respectively of Table 2.

(i) The machines shall be tested at loads corresponding to the major divisions or notches.

(f) With the exception of sensitiveness test [See (e) above], the other tests mentioned above shall be carried out in a similar manner on dial type machines also. These machines shall comply with the requirements prescribed in column 4 of Table 2.

6. SEALING:

(a) Platform machines of the dial type shall be fitted with a soft metal plug for receiving the seal of the verification authority and wherever practicable, this plug shall be passed through the dial and frame. The plug or stud fitted on the dial shall be so supported as to prevent the risk of any damage to the instrument.

(b) On platform machines other than those of the dial type a plug or stud shall be provided in a conspicuous position on the indicating lever or steelyard.

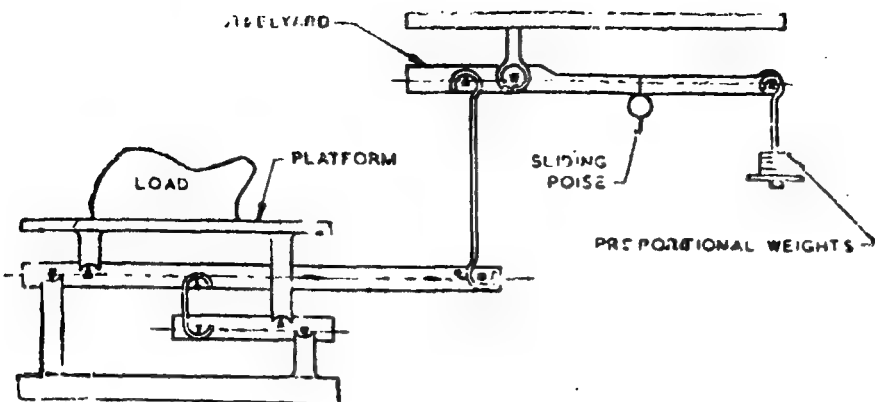


Fig. 1.—Platform Weighing Machine

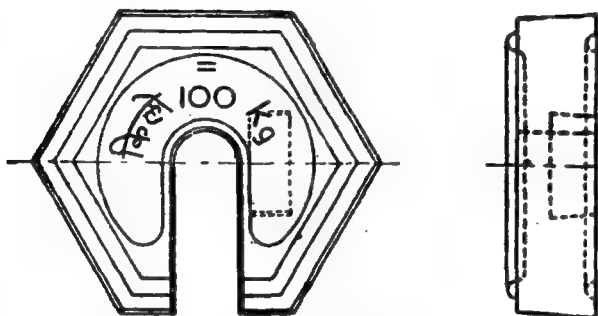


Fig. 2.—Proportional Weight

TABLE 1.—RANGE OF BALANCING ARRANGEMENT

Capacity	Range of balancing arrangement	
	Maximum 0.5 percent of capacity	Minimum 0.125 per cent of capacity each way
1	2	3
50 kg	250 g	60 g
100 kg	500 g	125 g
150 kg	750 g	185 g
200 kg	1 kg	250 g
250 kg	1.3 kg	310 g
300 kg	1.5 kg	350 g
500 kg	2.5 kg	625 g
1000 kg	5.0 kg	1.25 kg
1500 kg	7.5 kg	1.88 kg
2000 kg	10.0 kg	2.50 kg
3000 kg	15.0 kg	3.25 kg

TABLE 2.—SENSITIVENESS AND ERRORS FOR PLATFORM MACHINES

Capacity	Verification		Inspection	
	Sensitive- ness when fully loaded	Greatest error allowed in excess or in deficiency when fully loaded	Sensitive- ness when fully loaded	Greatest error allowed in excess or in deficiency when fully loaded for
	Non-dial type machine	Platform machines fitted with dials	Non-dial type machines	Platform machines fitted with dials
50 kg	10 g	20 g A weight	30 g	40 g A weight
100 kg	20 g	40 g correspo-	60 g	80 g correspon-
150 kg	30 g	60 g nding to	90 g	120 g ding to the
200 kg	40 g	80 g one-half	120 g	160 g interval
250 kg	50 g	100 g the inter-	150 g	200 g between
300 kg	60 g	120 g val betw-	180 g	240 g consecu-
				tive
500 kg	100 g	200 g een-conse-	300 g	400 g gradua-
1000 kg	125 g	250 g cutive	375 g	500 g tions.
1500 kg	200 g	400 g gradua-	600 g	800 g
2000 kg	250 g	500 g tions.	750 g	1000 g
3000 kg	300 g	1000 g	900 g	2000 g

PART VI—SPRING BALANCES

1. DEFINITION:

(a) A spring balance is an instrument which, on the application of the load to be weighed, indicates the whole weight by the extension or compression of the spring, such extension or compression being registered by means of a pointer on a dial.

(b) The general arrangement of spring balance without scoop and support is illustrated in Fig. 1.

2. CAPACITIES:

The spring balance shall be of one of the capacities shown in Table 1.

3. GENERAL REQUIREMENTS:

(a) In addition to the general requirements specified in Part I of this schedule, spring balance shall comply with the requirements given below.

(b) The spring balance with the goods pan below the spring shall be suspended permanently from a stand, support or bracket.

(c) If pans are provided for the balance, they shall be made of brass, bronze, cast iron, mild steel or stainless steel. Metal chains or metal supports shall be provided if pans are suspended. When mild steel is used, it shall be suitably protected against corrosion.

(d) The extremity of the pointer shall not exceed 1.0 mm in width and shall not be more than 3.0 mm away from the graduation on the dial.

(e) The dial shall be graduated into equal parts and the width apart of the graduations shall be not less than 2 mm.

(i) The weight corresponding to the interval between consecutive graduation marks shall not exceed the values given in Table 1.

(ii) When the graduation commences at a fixed load, the position of the index, when there is no load shall be clearly indicated by a zero mark.

(f) When a spring balance is provided with an adjustable indicator, the range of adjustment shall not exceed one per cent of the capacity of the instrument, except the case of instruments used for mining purposes where it shall not exceed two per cent.

(g) Spring balances shall have a device incorporated in the design to prevent overloading.

(h) The body of the spring balances shall be constructed of brass, cast iron, mild steel or any other suitable material, and shall be sufficiently robust in construction.

4. TEST:

(a) When the pan is below the spring, the prescribed limits of errors shall not be exceeded, wherever the load is placed on it.

(b) If the pan is in the form of a scoop and half the full load is placed at the farthest point from the centre of the scoop and the other half at any position, balance shall be correct to the prescribed limits of error.

(c) When the pan is not in the form of a scoop the spring balance shall indicate the correct weight within half the prescribed limits of error, if the centre of a load equal to half the capacity is placed on the pan any where within a distance from the centre equal to one-third of the greatest length of pan, or if that pan has a vertical side against the middle of that side, the weight being entirely on the weight pan.

(d) Each graduation shall be tested.

(e) The instrument shall be correct whether the test is made by progressively increasing or decreasing the loads, provided that in either case the spring shall be allowed to vibrate before the reading is taken.

(f) The balance shall be loaded to its capacity, and the load maintained for a period of 24 hours after which it shall be removed. Four hours after removal of the load, the balance shall not show any permanent set. Further when tested as stated in (e) above, it shall record correct readings.

(g) Spring balances shall not be tested for sensitiveness.

5. SEALING:

Spring balances shall be fitted with a soft plug to receive a seal and wherever practicable, this plug shall pass through the dial or frame. The plug or stud shall be so supported as to allow no risk or injury to the instrument.

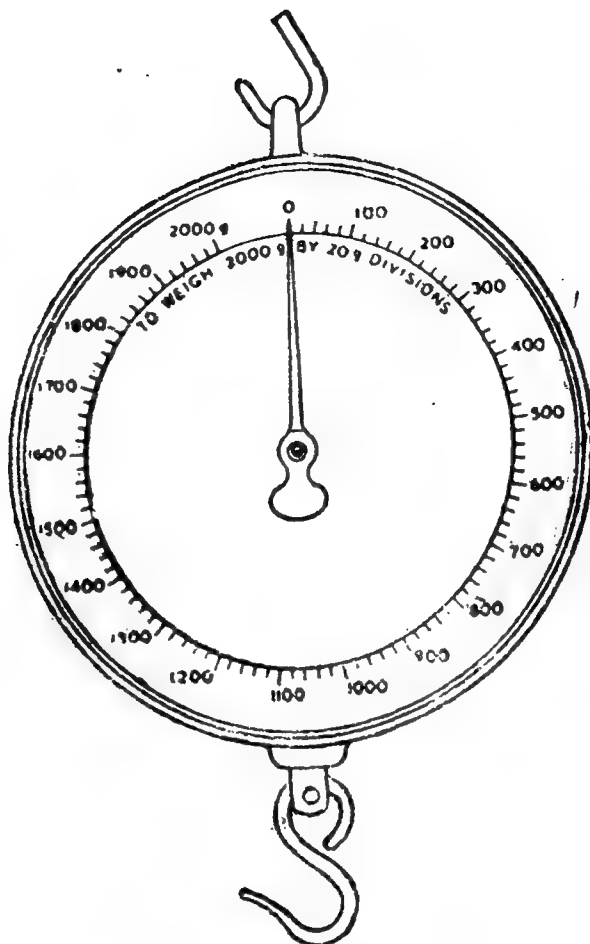


Fig. 1.—Spring Balance

TABLE 1—MAXIMUM ERRORS FOR SPRING BALANCES

Capacity	Weight corresponding to interval between consecutive graduation marks	Maximum error	Remarks
1	2	3	4
1 kg	5 g	A weight corresponding to 25 per cent of the interval between successive graduations.	While fixing the diameter of effective circle on dial of one revolution, a blank space of the 15 mm at the end of graduations has to be provided.
2 kg	20 g		
5 kg	20 g		
10 kg	50 g		
15 kg	50 g		

1	2	3	4
20 kg	100 g	A weight corresponding to 50 per cent of the interval between successive graduations.	In the case of multi-revolution spring balances, the minimum blank space requirement shall not apply.
30 kg	100 g		
50 kg	200 g		
100 kg	500 g		
150 kg	1.0 kg		
200 kg	1.0 kg		
300 kg	1.0 kg		
500 kg	2 kg		

Note.—Inspection tolerances shall be double the values shown in Col. 3.

PART VII—WEIGHBRIDGES

1. DEFINITION:

A weighbridge shall mean a weighing instrument constructed with compound levers, with the indicator system carried on foundations separate from the lever systems to weigh loads of capacities 1000 kg (one tonne) and over, through the medium of proportional weights or indicating mechanism. A typical weighbridge is illustrated in Fig. 1.

2. CAPACITIES:

Weighbridges may be of the following capacities:—

1t, 2t, 3t, 5t, 10t, 15t, 20t, 25t, 30t, 40t, 50t, 60t, 80t, 100t, 150t, 200t, 300t and 400t.

3. GENERAL REQUIREMENTS:

(a) In addition to the general requirements specified in Part I of this schedule, weighbridges shall comply with the requirements given below.

(b) *Framework.*—Where the weighbridge is fitted with a framework, it shall be built up of mild steel sections or cast iron or cast steel. It shall be of rigid structure, suitably strengthened so that it is capable of resisting excessive vibrations and shall not throw the lever system out of alignments. Brackets shall be provided on the side and end frames to secure the framework.

(c) *Steelyard.*—(i) The steelyard of a weighbridge shall not have any readily removable parts except the support for the proportional weights. There shall be one or more stops to prevent the sliding poise or poises from travelling behind the zero mark.

(ii) The minimum travel of the steelyard in weighbridges shall be 13 mm each way.

(iii) The top and bottom of the guide and or steelyard shall be fitted with non-magnetic material.

(iv) When the steelyard is provided with notches, the latter shall be suitably protected.

(v) The value of the smallest division on the minor bar shall not exceed the greatest error allowed for that capacity (See Table 2).

(d) *Graduations.*—The value of the smallest graduation on dials or minor steelyards, and wherever possible major steelyards of weighing instruments shall be 1 g, 2 g, 5 g, or any multiple by 10 or a power of 10 (for instance, 100 and 1000 etc.) of any of these weights.

(e) *Platform*.—(i) The platform shall be either chequered or plain, and shall be made of cast iron or steel plates. It shall be rigid and sufficiently strong to carry the maximum load. The foundation shall provide for a man-hole to facilitate easy access to the pit.

(ii) If a movable hutch, barrow, frame or bucket is used with the ordinary platform, it shall form an essential part of the machine without which it is not possible to balance the machine. The movable hutch, barrow, frame or bucket shall be identified with the machine and when in position on the platform, it shall be as central as possible.

(f) *Balancing arrangement*.—The balancing arrangement for daily wear and tear shall have a range not exceeding 0.5 per cent of the capacity of the machine and not less than 0.125 per cent of the capacity each way, the balance box containing the balancing ball shall be securely attached to the steelyard, preferably by passing a bolt through the casting to the steelyard. The balancing ball shall be actuated by a detachable key.

(g) In the case of weighbridges provided with dials:—

(i) Racks and pinions shall be of suitable hard-wearing material finished smooth.

(ii) The extremity of the pointer shall, in no position be at a greater distance than 5 mm from the graduated surface of the dial. Further, the extremity of the pointer shall be on the graduated portion of the dial, and it shall be so made as not to obscure the graduation or make them difficult to read.

(iii) The dials shall be graduated into equal parts and the minimum width between graduations shall be not less than 2 mm.

(h) For no-loose weight steelyard machines, the total capacity shall be that which is indicated on the steelyard.

4. PROPORTIONAL WEIGHTS:

(a) All loose proportional weights shall be identified with the machine by a number or any other suitable mark of identification which shall be indelible. They shall be marked with their equivalent weights as shown in Fig. 2.

(b) Proportional weights shall be hexagonal in shape with a slot of suitable size to allow their being placed on the counter balance (See Fig. 2).

(c) The proportional weights shall be made of cast iron or brass.

(d) The proportional weights shall have one rectangular loading hole which shall be under-cut or tapering outwards so as to hold lead securely for adjustment. The surface of the lead in the loading hole of a new proportional weight shall be at least 3 mm inside from the bottom surface of the weight.

(e) The smallest denomination of the proportional weight shall be equivalent to the weight represented by the maximum graduation on the minor bar.

(f) The denominations of the proportional weights shall be 1 kg, 2 kg, 5 kg or a multiple or sub-multiple by 10 or a power of 10 (100, 1000 etc.) of any of these weights. Any number of proportional weights in any one of the aforesaid denominations may be included provided the total equivalent of all the proportional weights does not exceed the capacity of the weighing instrument.

Note.—While arriving at the capacity of the weighbridge, the maximum graduation shown on the steelyard in the case of “loose-weight” weighbridges and on the minor bar in the case of “no loose weight” type weighbridges shall not be taken into account.

(g) The total capacity of the machine shall include the capacity of graduated tare bar or bars wherever provided.

Note.—When tare bars are used and are not graduated except with zero mark only they shall not be taken into account when calculating the capacity of the machines. Ungraduated tare bars shall be marked with zero.

5. TESTS AND TEST REQUIREMENTS:

(a) The steelyard of a weighbridge shall remain horizontal at no-load.

(b) Weighbridges shall be tested to verify the accuracy of graduations or notches upto the total capacity.

(c) All loose proportional weights, where these are provided, shall be tested and then suitably sealed to prevent tampering.

(d) With one quarter of the maximum load (or as near thereto as practicable) placed in the middle or at any of the corners of the platform, the weighbridge shall indicate the same weight within half the limits of error prescribed in Table 2 in column 3 for non-dial type machines and in column 4 for dial type machines.

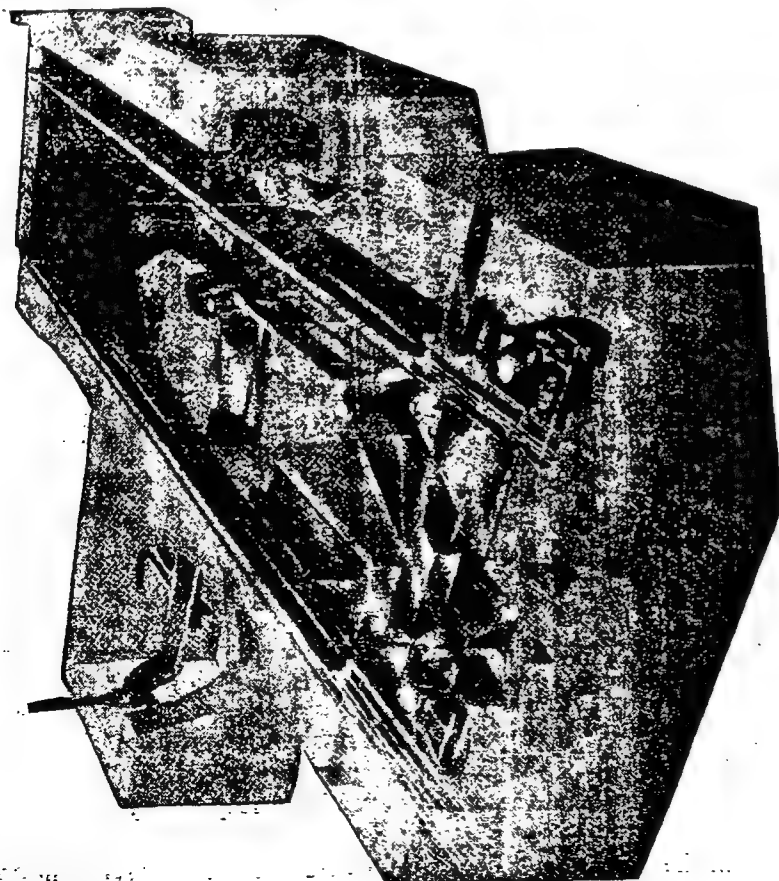


Fig. 1.—Weighbridge

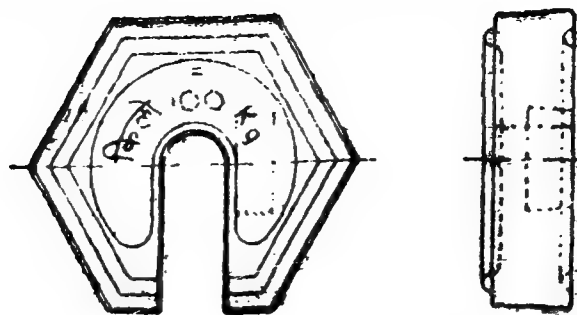


Fig. 2.—Proportional weight

TABLE 1—RANGE OF BALANCING ARRANGEMENT

Capacity	Range of balancing arrangement	
	Maximum 0.5 per cent of capacity	Minimum 0.125 per cent of capacity each way
	kg	kg
1 t	5	1.25
2 t	10	2.50
3 t	15	3.75
5 t	25	6.2
10 t	50	12.5
15 t	75	19.0
20 t	100	25.0
25 t	125	31.0
30 t	150	35.5
40 t	200	50.0
50 t	250	62.0
60 t	300	75.0
80 t	400	100.0
100 t	500	125
150 t	750	188
200 t	1000	250
300 t	1500	375
400 t	2000	500

(e) Weighbridges with steelyard arrangement shall be tested for sensitiveness and error at full load or as near to it as practicable. The sensitiveness and permissible error shall not exceed the limits prescribed in columns 2 and 3 respectively of Table 2.

(i) The machines shall be tested at loads corresponding to all major divisions or notches.

(ii) With the exception of sensitiveness test, the other tests mentioned above shall be carried out in a similar manner on dial type machines also. These machines shall comply with the requirements prescribed in column 4 of Table 2.

TABLE 2—SENSITIVENESS AND ERRORS FOR WEIGHBRIDGES

Capacity of machine	Verification		Inspection					
	Sensitive-ness when fully loaded	Greatest error allowed in excess or-deficiency when fully loaded	Sensitiveness when fully loaded	Greatest error allowed in excess or deficiency when fully loaded for				
					Non-dial type machine	Machines fitted with dials	Non-dial type machine	Machines fitted with dials
					3	4	5	6	7
1	2	3	4	5	6	7		
	kg	kg		kg	kg			
1 t	1.1	1.2	A weight	3.3	2.4	A weight		
2 t	1.2	1.4	corres-	3.6	2.8	corres-		
3 t	1.3	1.6	ponding	3.9	3.2	ponding		
5 t	1.5	2.0	to one-	4.5	4.0	to inter-		
10 t	2.0	3.0	half	6.0	6.0	val		
15 t	2.5	4.0	the	7.5	8.0	between		
20 t	3.0	5.0	interval	9.0	10.0	consecu-		
25 t	3.5	6.0	between	10.5	12.0	tive		
30 t	4.0	7.0	consecu-	12.0	14.0	gradua-		
40 t	5.0	7.0	tive	15.0	14.0	tions.		
50 t	5.2	7.8	gradua-	15.6	15.6			
60 t	5.5	8.5	tions.	16.5	17.0			
80 t	6.0	10.0		18.0	20.0			
100 t	6.5	11.5		19.5	23.0			
150 t	7.8	15.2		23.4	30.4			
200 t	9.8	19.0		27.0	38.0			
300 t	15.0	30.0		45.0	60.0			
400 t	20.0	40.0		60.0	80.0			

6. IDENTIFICATION OF PARTS:

Detachable parts which may affect the accuracy of the weighbridge shall be indelibly numbered or marked also as to facilitate identification.

7. SEALING:

(a) Dial machines shall be fitted with a soft metal plug for receiving the seal of the verification authority and wherever practicable, this plug shall be passed through the dial and frame. The plug or stud fitted on the dial shall be so supported as to allow no risk of damage to the instruments.

(b) On weighbridges other than dial machines, a plug or stud shall be provided in a conspicuous position on the indicating lever or steelyard.

PART VIII—CRANE WEIGHING MACHINES

1. DEFINITION:

A crane weighing machine is a weighing instrument designed on lever or spring principle specially constructed for suspension from the hook of a crane and fitted with a hook for lifting the load.

Note.—A lever type machine with open steelyard is illustrated in Fig. 1, Fig. 2 illustrates a dial type machine.

2. CAPACITIES:

Crane weighing machines may be of the following capacities:—

500 kg, 1 tonne, 2 tonnes, 3 tonnes, 5 tonnes, 10 tonnes, 15 tonnes, 20 tonnes, 30 tonnes, 50 tonnes, 100 tonnes and 200 tonnes.

3. GENERAL REQUIREMENT:

(a) In addition, the general requirements in part 1 of the schedule, crane weighing machines shall comply with the following requirements:—

- (i) The machine shall be sufficiently strong to withstand wear and tear in the exacting conditions under which it works.
- (ii) No crane weighing machine shall become a permanent link in the lifting gear.
- (iii) All working parts in a crane weighing machine shall as far as possible, be suitably protected from the dust and damp of the atmosphere. In a lever type machine, the steelyard shall be made of corrosion-resistant steel to withstand atmosphere influence and shall be sufficiently rigid and accurate.
- (iv) In dial type machines, the racks and pinions shall be of suitable hard-wearing material and finished smooth.
- (v) The range of balancing or adjusting arrangement shall not exceed 2 per cent of the capacity of the machine (See Table 3).
- (vi) In a steelyard type machine, there shall be free movement of the steelyard. In a dial type machine, the dial indicator shall work freely and return to its initial starting point after the load is removed.
- (vii) In the case of a crane weighing machine provided with hooks, trays or slings, these shall form essential parts without which it is not possible to balance the machine. These shall be identified with the machine.
- (viii) The value of smallest graduation on dials or minor steelyards and, wherever possible, major steelyard shall be 1 g, 2 g, 5 g or any multiples of 10 or a power of 10 (for instance 100, 1000 etc.) of any of these weights.
- (ix) The total capacity of the machines shall include the capacity of graduated tare bar or bars wherever provided.

Note.—When tare bars are used and are not graduated except with a zero mark only, they shall not be taken into account when calculating the capacity of the machines. Ungraduated tare bars shall be marked with zero.

4. TESTS:

(a) Crane machines of the steelyard type shall be tested for sensitiveness and greatest error at full load and shall comply with the requirements of Table 1.

(b) Crane machines of the dial type shall be tested for greatest error at full load and shall comply with the requirements of Table 2.

(c) Spring type crane machines shall not be tested for sensitiveness.

(d) For spring type machines, the limits of greatest error shall be double of those prescribed for steelyard machines (*See Table 1*).

(e) Each numbered graduation shall be tested and the instrument shall be correct whether the test is carried out with increasing or decreasing.

(f) The intermediate graduations shall also be tested to see that they are correct and are at proper distance apart.

(g) No test for sensitiveness at a load lower than the full load shall be made.

5. SEALING:

Crane machines shall be fitted with a irremovable plug in a conspicuous part, either on the steelyard or on the dial to receive the seal of the verification authority.

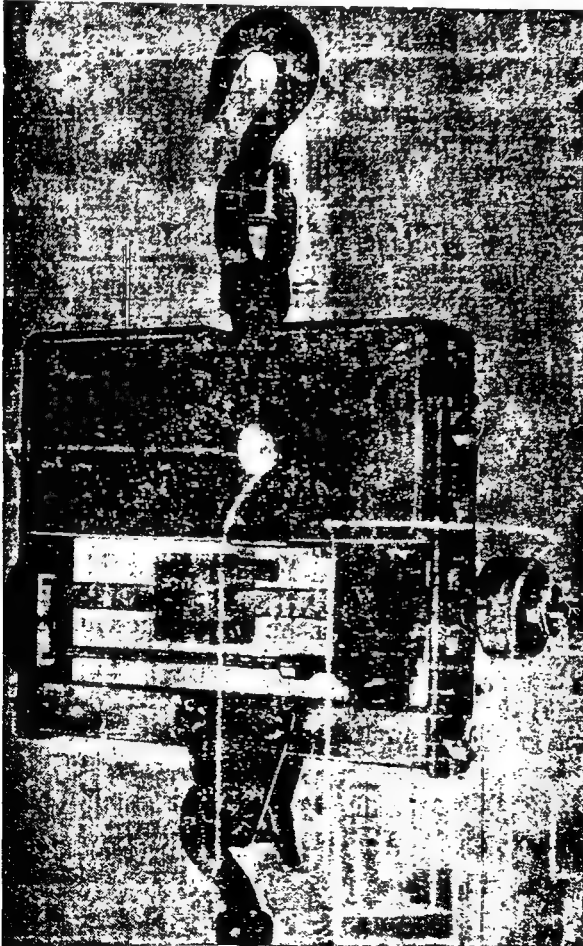


Fig. 1.—Crane Weighing Machine, Steelyard Type

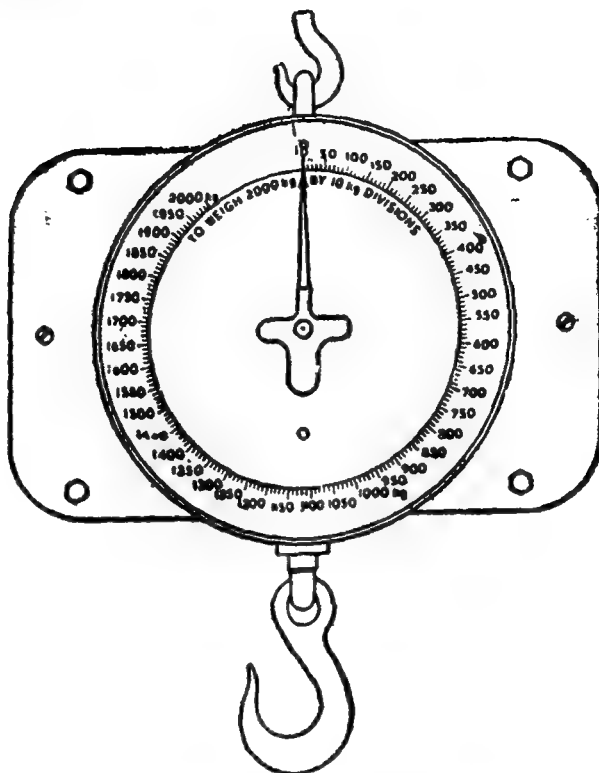


Fig. 2.—Crane Weighing Machine, Dial Type

TABLE 1—LIMITS FOR SENSITIVENESS AND GREATEST ERRORS FOR CRANE WEIGHING MACHINES—STEELYARD TYPE

Capacity	Verification		Inspection	
	Sensitiveness when fully loaded	Greatest error allowed in excess or deficiency when fully loaded	Sensitiveness when fully loaded	Greatest error allowed in excess or deficiency when fully loaded
500 kg	100 g	200 g	300 g	400 g
1 t	1.1 kg	1.2 kg	3.3 kg	2.4 kg
2 t	1.2 kg	1.4 kg	3.6 kg	2.8 kg
3 t	1.2 kg	1.6 kg	3.9 kg	3.2 kg
5 t	1.5 kg	2.0 kg	4.5 kg	4.0 kg
10 t	2.0 kg	3.0 kg	6.0 kg	6.0 kg
15 t	2.5 kg	4.0 kg	7.5 kg	8.0 kg
20 t	3.0 kg	5.0 kg	9.0 kg	10.0 kg
30 t	4.0 kg	7.0 kg	12.0 kg	14.0 kg
50 t	5.2 kg	7.8 kg	15.6 kg	15.6 kg
100 t	6.5 kg	11.5 kg	19.5 kg	23.0 kg
200 t	9.0 kg	19.0 kg	27.0 kg	38.0 kg

TABLE 2.—LIMITS FOR GREATEST ERROR FOR CRANE WEIGHING MACHINES—
DIAL TYPE

Capacity	Minimum weights corresponding to interval between successive graduations	Greatest error allowed in excess or deficiency when fully loaded	
		Verification	Inspection
1	2	3	4
500 kg	5 kg	A weight corresponding to half the interval between successive graduations.	A weight corresponding to the interval between successive graduations.
1 t	5 kg		
2 t	5 kg		
3 t	10 kg		
5 t	25 kg		
10 t	50 kg		
15 t	50 kg		
20 t	100 kg		
30 t	100 kg		
50 t	250 kg		
100 t	500 kg		
200 t	500 kg		

TABLE 3—RANGE OF BALANCING ARRANGEMENT

Capacity	Range of balancing arrangement
500 kg	10 kg
1 t	20 kg
2 t	40 kg
3 t	60 kg
5 t	100 kg
10 t	200 kg
15 t	300 kg
20 t	400 kg
30 t	600 kg
50 t	1000 kg
100 t	2000 kg
200 t	4000 kg

PART IX—AUTOMATIC WEIGHING MACHINES

1. DEFINITION:

An automatic weighing machine may be defined as any weighing scale which has an integral mechanism for automatically admitting and discharging a load and may be fitted with an apparatus for counting or otherwise recording the number of loads handled.

2. CAPACITIES:

Automatic machines shall be of the capacities as agreed upon between the purchaser and the seller.

3. DESIGN AND CONSTRUCTION:

(a) Automatic weighing machines and their integral parts, shall be identified with the machines, by an indelible number or other marks of identification.

(b) The adjusting mechanism shall be suitably secured or constructed so that it cannot be tampered with.

(c) The capacity of the automatic weighing machine shall be marked legibly on the conspicuous part of the machine.

4. TESTS:

(a) Automatic machines shall be tested for errors according to the requirements of Table 1.

(b) The accuracy of the output of the machine shall be verified by re-weighing in another weighing instrument not less than 20 continuous loads, or where practicable, the machine may be tested directly by the application of standard weights.

(c) In testing totalising machines, not less than 50 loads shall be passed over the machine, namely, 10 minimum loads, 10 maximum loads and 30 loads of the mean between the minimum and maximum.

5. SEALING:

Automatic machines shall be fitted with a plug on the beam, shank or dial of the machine to receive the seal.

TABLE 1—PERMISSIBLE ERRORS FOR AUTOMATIC MACHINES

Use	Capacity	Error (Verification or Inspection)
Weighing small loads of tea, coffee, etc.	20 g and upwards.	0.5 per cent of the load in excess only.
Weighing grain etc.	5 kg and upwards.	0.25 per cent of the load, in excess or deficiency.
Weighing coal etc.	50 kg and upwards.	0.5 per cent of the load in excess or deficiency
		The allowances in these cases are subject to the proviso that the error tolerated shall not exceed the weight represented by half a minimum division marked on the dial or steelyard.
Totalising machines used for weighing coal etc.	500 kg and upwards.	0.5 per cent of the total load of 50 weighings in excess or deficiency.

PART X—SELF-INDICATING AND SEMI-SELF INDICATING COUNTER TYPE WEIGHING MACHINES

1. DEFINITION:

(a) *Self-Indicating Machine*.—A machine which on the application of the load to be weighed, indicates the whole of the load automatically. A typical self-indicating machine is illustrated in Fig. 1.

(b) *Semi-self-Indicating Machine*.—A machine which, on the application of the load to be weighed, indicates automatically only a portion of the weight of the whole load leaving the remainder to be balanced by weight or sliding poises fitted to the tare or capacity bars or by any other suitable means. A typical semi-self-indicating machine is illustrated in Fig. 2.

2. CAPACITIES:

The self-indicating or semi-self-indicating machines may be of the capacities shown in Table 1.

3. GENERAL REQUIREMENTS:

(a) Self-indicating or semi-self-indicating machines are generally constructed by incorporating a beam or levers coupled to a pendulum or other type of resistance system, excluding springs, so as to produce an indicating arrangement for the machine. The arrangement of the lever system of machine shall be such that the horizontality of the goods and weight pan fittings throughout the movement of the beam is preserved. The machine shall be provided with dash pot or any other suitable arrangement so as to bring the pointer quickly to rest.

(b) The supports for the pans shall be of a suitable rigid structure. The pans shall be made of mild steel, stainless steel, brass or bronze, aluminium or its alloys, porcelain, enamel coated steel, glass or plastic materials.

(c) The bearing surfaces, knife edges and points of contacts of all stays, hooks and loops shall be of hard steel or agate. The knife edges and bearings shall be so fitted as to allow the beam to move freely and the knife edges shall rest on their bearings at practically their entire length. All levers and resistance mechanism shall be enclosed as far as possible.

(d) The machines shall have a balance box for minor adjustments. The balance box shall be permanently fixed, preferably beneath the weight pan and shall be large enough to contain loose material to an amount upto one per cent of the capacity of the machine. No other adjusting contrivance shall be used. In case of self-indicating machines, the balance box shall be fixed below the goods pan.

(e) The chart of the machines shall be graduated into equal parts and the width apart of the graduations shall be not less than 1.5 mm (unless magnification is provided on the chart) for a capacity of 10 kg and under, and not less than 2 mm for a capacity above 10 kg. The weights corresponding to one-half the interval between consecutive graduation marks shall not exceed the greatest error allowed as shown in Table 1. The extremity of the pointer shall not exceed on millimetre in width and shall not be more than 3 mm away from the chart. The position of the index when there is no load shall be clearly indicated by zero mark.

(f) The value of the minor graduation on the chart shall correspond to one of the weights in the series 1 g, 2 g, 5 g or its decimal multiples of 10 or of powers of 10.

(g) The self-indicating and semi-self-indicating machines, excepting out of level-scales, shall be provided with levelling screws and a circular bubble.

(h) When tare bars are graduated, they shall only be permitted, provided the chart capacity (chart puls tare bar) comply with capacities shown in Table 1.

Note.—When tare bars are used and are not graduated except with a zero mark, they shall not be taken into account when calculating the capacity of the machine. Ungraduated tare bars shall be marked with zero.

4. TESTS:

(a) All self-indicating and semi-self-indicating machines shall be tested on a horizontal level plane.

(b) The machines shall be tested throughout the full range of their capacity by progressively increasing the load, the permissible error shall not exceed the limits specified in Table 1.

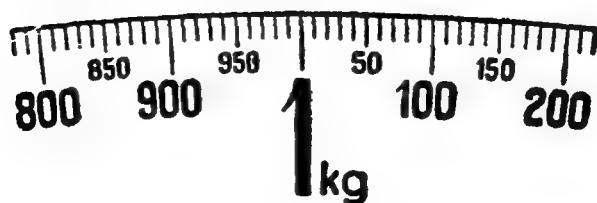


Fig. 1.—Self-indicating Machine

(c) When the pans are loaded to half the capacity there shall be no appreciable difference in the weight indicated on the dial when the load is moved within a distance from centre equal to one-third from the greatest length of the pan.

(d) When the goods pan is in the form of a scoop, the machine shall be correct to the prescribed limits of error if half the full load is placed against the middle of the back of the scoop and the other half in any position on the scoop.

(e) Self-indicating and semi-self-indicating machines shall not be tested for sensitiveness.

5. SEALING:

(a) Each machine shall be provided with a plug or stud of soft metal on a conspicuous part of the beam or body for receiving a seal. Such a plug or stud shall be made irremovable by undercutting it or by some other suitable manner



Fig. 2.—Semi-self-Indicating Machine

TABLE 1—LIMITS FOR GREATEST ERROR FOR SELF-INDICATING AND SEMI-SELF-INDICATING COUNTER TYPE WEIGHING MACHINE

Capacity 1	Mx. value of the minor graduation 2	Greatest error allowed in excess or in deficiency when fully loaded	
		Verification 3	Inspection 4
(a) Self-indicating machines			
100 kg	200 g	100 g	200 g
50 kg	100 g	50 g	100 g
30 kg	100 g	50 g	100 g
20 kg	100 g	50 g	100 g
10 kg	50 g	25 g	50 g
5 kg	20 g	10 g	20 g
3 kg	10 g	5 g	10 g
2 kg	10 g	5 g	10 g
1 kg	10 g	5 g	10 g
500 g	5 g	2.5 g	5 g
200 g	2 g	1.0 g	2 g
100 g	1 g	0.5 g	1 g
(b) Semi-self-indicating machines			
100 kg	100 g	50 g	100 g
50 kg	40 g	20 g	40 g
30 kg	30 g	15 g	30 g
20 kg	20 g	10 g	20 g
10 kg	10 g	5 g	10 g
5 kg	10 g	5 g	10 g
3 kg	10 g	5 g	10 g
2 kg	10 g	5 g	10 g
1 kg	10 g	5 g	10 g
500 g	4 g	2 g	4 g
200 g	2 g	1 g	2 g
100 g	1 g	0.5 g	1 g

Note.—The maximum error shall not exceed the value of half the minor division indicated on the chart.

PART XI—PERSON WEIGHING MACHINES

1. DEFINITION:

(a) A person weighing machine means an instrument with compound levers and with a platform to receive the person to be weighed. The weight of the person is indicated with a steelyard or any other form of indicator or by a ticket printing device.

(b) Person weighing machine of steelyard, dial and ticket printing types are illustrated in Fig. 1, 2 and 3 respectively. These drawings are illustrative only and do not specify any particular design.

2. CAPACITY:

The person weighing machine shall have a capacity not less than 120 kg.

3. GENERAL REQUIREMENTS :

(a) *Platform.*—The maximum size of the platform shall be 400 × 350 mm. The platform shall not extend beyond the frame on any side.

(b) *Steelyard Type Machine.*—(i) The steelyard shall not have any readily removable parts except the support for proportional weights. The minimum travel of a steelyard shall be 10 mm either way.

(ii) The top and bottom of the guide and or steelyard shall be fitted with non-magnetic material, if these are made of ferrous material.

(iii) When the steelyard is provided with notches, the later shall be suitably protected.

(iv) The value of the smallest division on the steelyard shall be graduated with $5 \text{ kg} \times 50 \text{ g}$ divisions.

(v) *Balancing arrangement.*—Where a balancing device is provided on the steelyard, the balance ball shall not be easily accessible. The balancing arrangement for daily wear and tear shall have a range not exceeding 0.5 per cent of the capacity of the machine and not less than 0.125 per cent of the capacity each way. The balancing device containing the balancing ball shall be securely attached to the steelyard. The balancing ball shall be actuated by knurled headed bolt passing through it.

(c) *Dial Type Machines.*—(i) Racks and pinions shall be of suitable hard wearing material and shall be finished smooth.

(ii) The extremity of the pointer shall in no position be at greater distance from the graduated surface of the dial than 5 mm and shall be made to meet but not to obscure the graduation marks.

(iii) The dial shall be graduated into equal parts and the minimum width apart of the graduations shall not be less than 1.5 mm. The minimum graduation shall be 500 g.

(d) *Ticket Printing Type Machines.*—(i) Racks and pinions shall be of suitable hard wearing material and shall be finished smooth.

(ii) The weight shall be legibly indicated on the ticket.

4. PROPORTIONAL WEIGHTS:

(a) All loose proportional weights shall be identified with the machine by a number or any other suitable marks of identification which shall be indelible. The counterpoise weights shall be marked with their equivalent weights in the following manner:—

किलो 5 kg

(b) Proportional weights shall be hexagonal in shape with a slot of suitable size to allow them being placed on the counter balance.

(c) The proportional weights shall be made of cast iron or brass.

(d) The proportional weights shall have one rectangular loading hole which shall be undercut or tapering outside so as to hold lead securely for adjustments. The undercut hole shall be of reasonable size so as to accommodate the lead required for adjustments. The surface of the lead in the loading hole shall not be less than 2 mm inside from the bottom surface of the weights.

(e) The steelyard type person weighing machine shall be provided with suitable proportional weights. The denominations of proportional weights shall be 1 kg, 2 kg, 5 kg or a multiple or sub-multiple by 10 or a power of 10 (100, 1000 etc.). The total value of the proportional weights shall not exceed the capacity of the machine. For the purpose of calculating total capacity the graduation on the steelyard shall not be taken into account.

5. TESTS:

(a) The steelyard of the person weighing machine with steelyard arrangement; shall remain horizontal at no load on the platform.

(b) With load weighing one-quarter of the maximum capacity of the machine or as near thereto as is practicable, the weighing machine shall indicate the same weight within half the prescribed limits of error whether the load is placed in the centre or any of the four corners of the platform.

(c) The machine shall be tested to verify the accuracy of graduations upto the total capacity.

(d) Person weighing machines with the steelyard arrangement shall be tested for error as well as for sensitiveness at full load. The permissible errors and sensitiveness are given in Table 1.

(e) Person weighing machines provided with dial type indicator or ticket printing device shall be tested for errors only. No sensitiveness test shall be taken on such machines. The permissible error at any load shall not exceed the limits prescribed in Table 1.

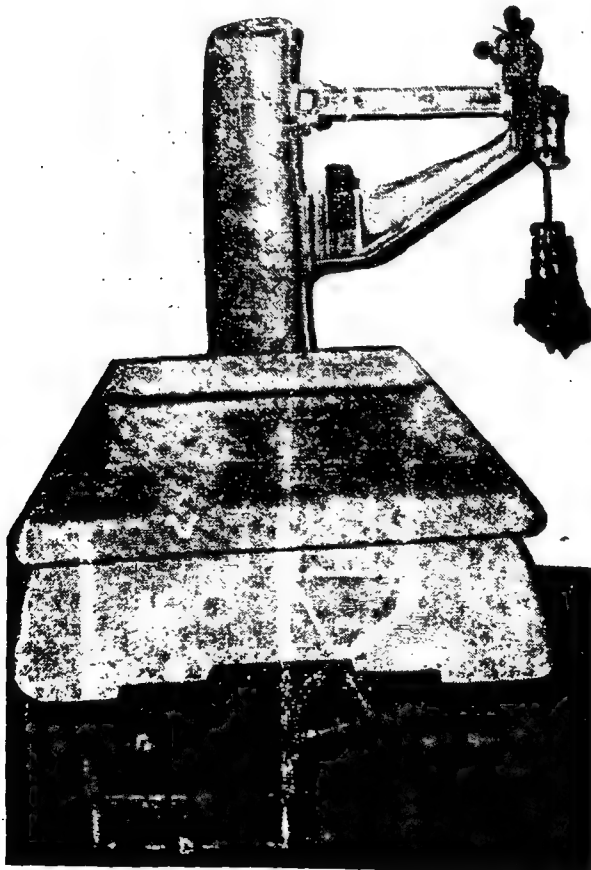


Fig. 1.—Person Weighing Machine, Steelyard Type

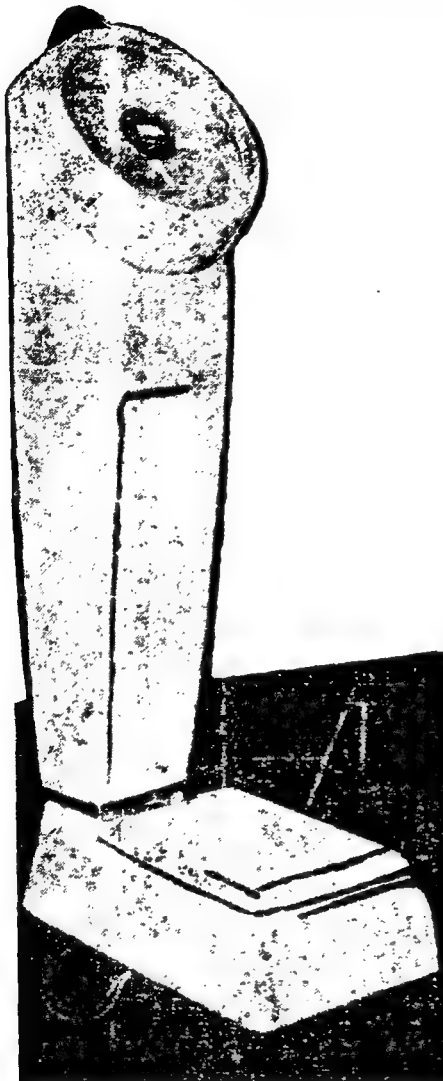


Fig.2.—Person Weighing Machine, Dial Type

TABLE 1—LIMITS FOR GREATEST ERROR FOR PERSON WEIGHING MACHINES

Type of Machine	Sensitivity when fully loaded	Greatest error allowed in excess or in deficiency when fully loaded	
		Verification	Inspection
1. Steelyard ..	25 g	50 g	100 g
2. Dial Type ..	—	250 g	500 g
3. Ticket Issuing Type	—	500 g	1 kg



Fig. 3.—Person Weighing Machine, Ticket Printing Type

PART XII—TOTALISING WEIGHING MACHINES

1. DEFINITIONS:

(a) *Totalising Hopper Weighing Machine*.—A totalising weighing machine in which the load is divided into a succession of discrete equal or unequal individual loads, which are weighed in a hopper, grab or other receptacle.

(b) *Continuous Belt Conveyor Weighing Machine*.—A totalising weighing machine in which the load is carried on an end-less flexible belt supported by a roller or rollers attached to the weighing mechanism.

2. GENERAL REQUIREMENTS:

(a) *Removable Parts*.—Every readily removable part of a machine, the removal of which would affect the correctness of the machine shall be so made and fitted that it is securely located in its operating position. A part shall be deemed to be readily removable if it is possible to remove it without the use of a tool.

(b) *Adjusting Mechanism*.—Any adjustable part or mechanism shall be secured or protected so that it shall not be altered without the use of a tool or accidentally put out of order during normal working.

(c) *Manual Controls*.—All manual controls, the operation of which might effect premature discharge, shall be inoperable whilst the weighing machine is in operation.

(d) *Minimum Weight Increment*.—The minimum weight increment of the totalizing register or indicator shall not exceed—

- | | |
|--|---|
| (i) For totalizing hopper weighing machine | 1/25 of maximum load. |
| (ii) For continuous belt conveyor weighing machine | Maximum rate of weighing in tonnes per hour/10,000. |

3. TEST FOR ACCURACY:

(a) The accuracy of the totalizing register or indicator shall be tested as follows and shall be within the limits specified under 3 (b):—

(i) *For totalizing hopper weighing machines*.—A total test load equal to not less than forty times the maximum load for which it is designed shall be reweighed on another instrument (the accuracy of which has been previously verified by the Inspector). The total test load shall be built up from individual loads varying from the minimum load marked on the machine to the maximum. Where the foregoing test is not practicable, the machine shall be tested by the application of standard weights.

(ii) *For a continuous belt conveyor weighing machine*.—A total test load equal to not less than 500 times the minimum weight increment of a totalizing register or indicator shall be reweighed over another instrument (the accuracy of which has been previously verified by the Inspector). If the machine is capable of operating at various speeds of operation it shall be tested at the maximum reasonable speed and at the minimum.

(b) *Limits of Errors*.—The error in excess or in deficiency shall not exceed 0.5 per cent of the total test load passed over the machine.

4. MARKING AND IDENTIFICATION OF PARTS:

(a) *Rate of Weighing*.—Every totalizing weighing machine shall be clearly marked with the maximum and minimum rates of weighing for which it is designed, and with the maximum weight per weighing cycle or maximum instantaneous load it is designed to carry. The marking shall be in letters and figures of uniform size of a minimum height of approximately 5 mm.

(b) *Removable Parts*.—Every readily removable part, the removal of which would affect the correctness of machine shall be numbered or otherwise identified with the machine to which it belongs.

(c) *Loose Counterpoises*.—Loose counterpoises, when used for counter balancing, shall be clearly and indelibly marked together with their equivalent weights and shall be numbered to identify with the machine to which they belong.

PART XIII—BABY WEIGHING MACHINE

1. DEFINITION

(a) A baby weighing machine shall mean a weighing machine with a pan to receive the baby to be weighed. A typical baby weighing machine is illustrated in Fig. 1.

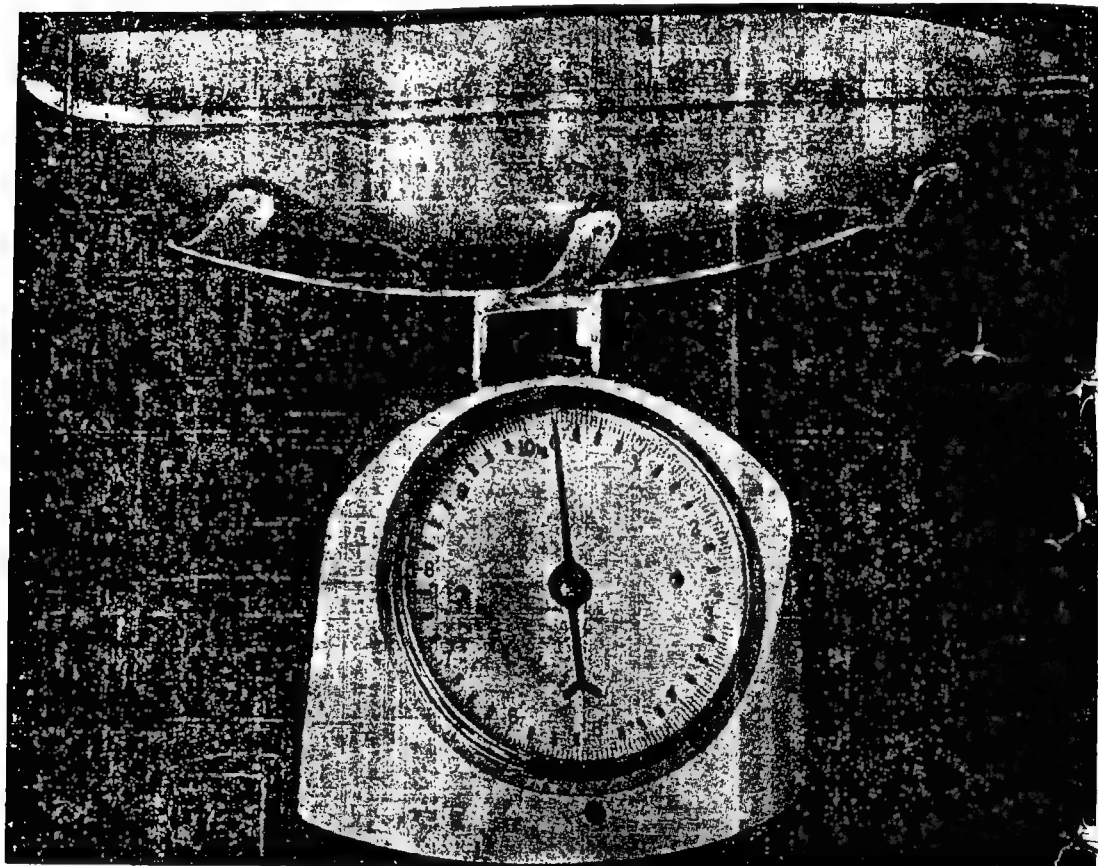


Fig. 1—Baby Weighing Machine

2. CAPACITY:

The machines shall have a maximum capacity of 10, 15 or 20 kg.

3. GENERAL REQUIREMENTS:

(a) The pan for the baby shall be either an oval or a rectangular basin, or an open-ended trough of the following approximate dimensions:—

		Minimum Dimensions
Length	..	550
Width	..	300
Depth:		
Basin type	..	100
Trough type	..	125

(b) The pan shall be smooth, non-porous, readily cleanable and of adequate strength and should preferably be made of a low heat-conducting material. Wicker-work shall not be used in the construction of the pan.

(c) Counter type baby weighing machines shall be provided with hard rubber or fibre stops to prevent noise or "jar" in the out of balance position.

(d) All machines shall be so constructed as to enable a direct net weighing to be obtained.

(e) Baby weighing machines of the spring-balance, self-indicating or semi-self-indicating types shall be fitted with efficient oscillation control devices.

(f) In spring-balance, self-indicating or semi-self-indicating type of baby weighing machines the dial shall be graduated into equal parts and the minimum distance between consecutive graduations shall be not less than 2 mm. Provision of a screw for adjustment of the pointer to correct zero error shall also be provided.

(g) The extremity of the pointer shall not exceed 1.0 mm in width and shall be not more than 3.0 mm away from the graduations on the dial. The weight corresponding to the interval between consecutive graduation marks shall not exceed 50 g.

(h) The base of the machine shall be wide and heavy to avoid tilting and the position of the index, when there is no load, shall be clearly indicated by a zero mark.

(i) When the weighing machine is provided with an adjustable pointer, the range of adjustment shall not exceed one per cent of the capacity of the machine.

4. TESTS:

(a) In spring-balance, self-indicating or semi-self-indicating type of machines, the permissible error shall not exceed the weight corresponding to half the interval between consecutive graduations.

(b) When a load equal to half the capacity of the machine is placed at the farthest point from the centre of the pan and the other half at any position, the machine shall be correct to the prescribed limit of error.

(c) Each graduation of the machine shall be tested.

(d) For counter type machines, the sensitivity and the greatest error shall be as under:—

Capacity	Sensitiveness when fully loaded	Greatest error in excess or deficiency when fully loaded	
		Verification	Inspection
10 kg	7.0 g	10.5 g	21 g
15 kg	8.0 g	12.0 g	24 g
20 kg	9.0 g	13.5 g	27 g

(e) The machine shall be correct whether the test is made by progressively increasing or decreasing loads provided that in either case the machine is allowed to vibrate before the reading is taken.

(f) The spring-balance type machine shall be loaded to its full capacity and the load maintainer for a period of 24 hours after which it shall be removed. Four hours after removal of the load, the balance shall not show any permanent set. Further when tested as stated in 4 (e), it shall record correct readings.

5. SEALING:

(a) Each machine shall be provided with a plug or stud of soft metal on a conspicuous part of the beam or the body for receiving a seal. Such a plug or stud shall be made irremovable by under-cutting it or by some other suitable method.

SCHEDULE VII
SPECIFICATIONS FOR COMMERCIAL VOLUME MEASURING INSTRUMENTS

PART I—GENERAL REQUIREMENTS

1. DEFINITION:

A measuring instrument shall mean a device designed to measure and deliver products in liquid form by volume.

2. GENERAL REQUIREMENTS:

(a) A measuring instrument shall be of such material, design and construction as to ensure, under normal working conditions, the following requirements:—

(i) Accuracy is maintained,

(ii) operating parts continue functioning satisfactorily, and

(iii) adjustment remains reasonably permanent.

(b) A measuring instrument shall not be stamped unless it is complete with all parts and attachments concerned with the operation of measurement and delivery.

(c) Where an instrument has inter-changeable or reversible parts, their inter-changeability or reversal shall not affect the accuracy of the instrument.

(d) All graduations indicating the quantities dispensed or delivered shall be legibly, clearly and indelibly marked.

(e) The graduated scale or indicating elements in a measuring instrument shall be so constructed as to show automatically its zero position and the amounts delivered up to the registering capacity of the instrument.

(f) Every measuring instrument of fixed type shall be so installed that the viewer can readily obtain a clear and unobstructed view of the indication of measurement and delivery.

(g) The design and construction of a measuring instrument shall be such as would prevent, as far as possible, tampering with the accuracy of the instrument either by inadvertent use or otherwise.

3. MARKING:

(a) All commercial measuring instruments, such as dispensing pumps, meters, volumetric container filling machines, shall be conspicuously, clearly and prominently marked with the registering capacity, name or registered trade-mark of the manufacturer and identification number.

(b) All commercial measuring instruments shall be provided with a plate riveted in a prominent position to receive the markings mentioned in 3 (a) and the stamp of the inspecting authority.

4. TEST REQUIREMENTS:

(a) All measuring instruments shall be tested under normal operating conditions.

(b) All instruments shall conform to the respective standards on accuracy requirements for the different kinds of measuring instruments.

5. SEALING:

(a) All measuring instruments shall be provided with one or more sealing arrangements for sealing by an inspecting authority to prevent tampering with stops or other adjustable parts affecting the quantity delivered.

PART II—DISPENSING PUMPS

1. DEFINITION:

(a) A dispensing pump is a measuring instrument used in conjunction with a storage tank or tanks for effecting deliveries of liquid products by specified volumes.

(b) "*Wet Hose*" System.—A type of device designed to be operated with the discharge hose full of liquid at all times. A "wet hose" is the discharge hose in this type of device.

(c) A "*Dry-Hose*" System.—A type of device in which the discharge hose is completely drained following each delivery. A "dry hose" is the discharge hose in this type of device.

2. TYPES:

(a) Dispensing pumps shall be either of the meter type or container type.

3. GENERAL REQUIREMENTS:

(a) A dispensing pump shall essentially consist of:—

- (i) Suitable casing or housing.
- (ii) Pumping unit.
- (iii) Metering unit or volumetric container.
- (iv) Register for quantities.
- (v) Flexible hose with nozzle.

4. Every dispensing pump shall be provided with an individual sales indicator, graduated to indicate all possible deliveries. Any other counting or totalizing device that may be provided, shall be so arranged as to avoid any possibility of confusion with the individual sales indicator.

5. A dispensing pump of meter type shall be so constructed that, after a particular delivery cycle has been completed by movement of the starting lever to its shut-off position, an effective automatic inter-lock shall prevent a subsequent delivery being started until the indicating elements have been returned to their correct zero position.

6. A dispensing pump of container type shall be so constructed that the individual sales indicator shall register only when the discharge from each container has commenced. A notice shall be prominently exhibited on the pump panel to indicate clearly and prominently the following:—

Please ensure before starting delivery.

- (i) Sales indicator is set at zero.
- (ii) Container is full.

7. Dispensing pumps of container type shall be provided with observation windows or other means for showing clearly that the container or containers are properly charged and discharged.

8. Dispensing pumps delivering the liquid under pressure shall work on the "wet hose" system, fitted with a nozzle having combination control valve and automatic pressure discharge valve which should operate under the pressure at which the pump is designed to deliver.

9. Dispensing pumps delivering liquid under gravity shall work on the "dry hose" system. The "dry hose" shall be of such length and stiffness as to facilitate complete and rapid drainage of the hose pipe and shall be provided with a nozzle without any valve.

10. The length of the discharge hose on a dispensing pump shall not exceed 5 metres from the outside of the housing of the pump to the inlet end of the discharge nozzle.

11. A dispensing pump of the meter type shall have an effective air eliminator unit situated after the pumping unit and immediately preceding the metering unit.

12. A dispensing pump of the container type shall have a suitable air vent to preclude the possibilities of the air-trap in the volumetric container.

13. TESTS:

(a) All dispensing pumps shall be tested for accuracy of discharge as described hereunder:—

(b) A dispensing pump shall be tested under practical working conditions with the liquid that the instrument is intended to deliver.

(c) All dispensing pumps shall be verified by check measures. The check measures may be of the denominations 1, 5, 10 and 20 litres.

(d) Every check measure shall be verified against the appropriate working standard measure at least once in every period of six months and duly sealed.

(e) Before commencing checking of dispensing pump, the pump shall be run for a few minutes to ensure that all the units are functioning smoothly and also the discharge hose has been wetted.

(f) A dispensing pump before being tested for accuracy shall be tested for leakage by being first fully primed.

14. The procedure for testing a dispensing pump shall be as follows:—

(a) The standard check measure shall first be filled to wet the entire inside surface. It shall then be emptied.

(b) The pointer (meter type) or reading (container type) of the recording mechanism shall then be set to zero.

(c) The pump shall be operated to dispense the liquid into the standard check measure until the pointer (meter type) is at zero position again or the reading (container type) records the capacity of the check measure.

(d) If the quantity of liquid delivered is in error beyond the permissible limits, the instrument shall be adjusted so that it delivers a quantity within permissible limits of error.

(e) Steps (b), (c) or (d) shall be repeated until the pump gives two consecutive deliveries within permissible limits of error.

(f) If the instrument has been found to give correct measure in the initial test itself, further test of accuracy shall be made and recorded.

15. Every dispensing pump shall deliver correctly at reasonable uniform speed which shall be not less than 10 litres per minute.

16. The permissible limits of error are specified below:—

Quantity	Verification (Errors in excess)	Inspection	
		Error excess	Error deficiency
20 litres	100 ml	Same as on verification.	50 ml
10 litres	50 ml		25 ml
5 litres	30 ml		15 ml
1 litre	10 ml		5 ml

No error in deficiency shall be permitted during verification.

SEALING AND STAMPING:

17. After adjustment for correct delivery lead-and-wire seals shall be applied in such manner that no further adjustment can be made, without mutilating the seal or seals. Plain wire shall not be used for lead-and-wire seal or seals. Inspector's stamp on the lead seal or seals shall be affixed by means of a plier. Inspector's stamp shall also be marked on the name-plate fixed on the dispensing pumps.

18. A name-plate to be fixed on the petrol pump for identification shall be of the shape and design shown below:—

Himachal Pradesh Weights and Measures (Enforcement) Act, 1968

Name of the owner of the Pump and Pump No.

Capacity of	Petrol	D. Pump	Litres
	H.S.D.		
*			

Name of State.

*Columns for Inspector's stamps.

19. CAPACITY:

The capacity of a dispensing pump of meter type shall be the maximum graduation on the dial or register.

The capacity of a dispensing pump of container type shall be the capacity of the container or where there is more than one container the aggregate capacity of the containers.

PART III—VOLUMETRIC CONTAINER FILLING MACHINES

1. DESCRIPTION:

(a) A volumetric container filling machine shall consist of a basin or basins, the capacity of each of which shall depend on the capacity of the containers, which it is intended to fill. The operation shall consist of first filling the machine to the required level and then emptying out the contents into the container or containers. (See Fig. 1).

(b) The machines shall have capacities of 1, 2, 5, 10, 15, 20, 50, 100 and 200 litres.

2. GENERAL REQUIREMENTS:

(a) The design of the filling machine shall be such that the measured quantity shall be entirely drained out on opening of the delivery valve.

(b) The basin shall be provided with adequate sight glasses, observation windows, cut-off valve or other means indicating clearly that the basin or basins are properly charged.

(c) The basin shall be provided with a suitable device such as a displacer, to enable adjustment of the capacity of the basin.

(d) Every flexible hose for discharging liquid from the basin together with the rigid delivery pipe which empties itself on discharge, shall be so arranged as to provide for ready and adequate drainage of the liquid.

(e) The filling machine shall be rigidly fitted on a stand.

(f) The walls of the basin shall be strong enough as not to cause any appreciable deflection due to the pressure of the liquid.

3. TESTS:

(a) All volumetric container filling machines shall be tested for accuracy of discharge as follows:—

(b) A volumetric container filling machine shall be tested under the actual working conditions with a suitable liquid preferably the one which the instrument is intended to deliver.

(c) Before checking a volumetric container filling machine, the inside of the basin or basins and the discharge hose and pipe shall be wetted by filling the machine and emptying.

(d) For testing volumetric container filling machines, a standard test measures shall be used.

(e) The procedure for testing the accuracy of volumetric container filling machines shall be as follows:—

(i) The standard test measure shall first be filled to full capacity in order to wet all inside surfaces. It shall then be emptied and completely drained.

(ii) The machine shall then again be filled to the full capacity.

(iii) The contents of each container of the machine shall be measured with a standard test measure/measures and the quantity so measured will indicate that the capacity is—

(a) within the permissible error, or

(b) beyond the permissible error.

(iv) If (iii) (b) be the case, the container shall be adjusted until the errors are brought within the permissible limits; and shall be repeated until the filling machines give two consecutive deliveries within the tolerance limits.

(f) Every container of the filling machine shall deliver correctly within the limits of tolerance specified in 3 (g).

(g) The permissible errors shall not exceed the limits specified below:—

Capacity	Maximum permissible error in excess only
10 litres and above	0.1 per cent
Below 10 litres	0.2 per cent.

4. SEALING:

(a) The volumetric container filling machines shall be provided by the manufacturer with a plug/plugs or stud/studs of soft metal to receive the stamp or seal of the verifying authority. Such plug/plugs or stud/studs shall be provided in a conspicuous part of the machine and shall be made in such a manner as to prevent its removal without obliterating the seal/seals.

SCHEDULE VII-A

LENGTH AND TIME MEASURING INSTRUMENTS

PART I—TAXIMETRES

1. TERMINOLOGY:

(a) *Taximeter*.—A device that computes and indicates the charges for the hire of a motor cab according to prescribed rates for distance and/or for time.

(b) *Facc*.—That side of a taximeter on which fare is indicated.

(c) *Flag*.—A lever arm or any other device by which the operating condition of a taximeter is controlled.

(d) *Money Drop*.—An increment in the fare indication.

(e) *Initial Money Drop*.—The fare indication following the depression of the flag from FOR HIRE to the HIRED position.

(f) *Initial distance or initial time interval.*—The distance or the time interval corresponding to the initial money drop.

(g) *Basic rates.*—The distance and waiting time rates for distances and time intervals other than those for the initial money drop.

(h) *Fare.*—That portion of the charge for the hire of a motor cab that is computed by a taximeter through the operation of the distance and time mechanism.

(i) *Extras.*—Charges to be paid by the hirer in addition to the fare for transportation of chargeable luggage.

(j) *Speed of agreement of basic rates.*—The speed at which the basic distance and basic time rates correspond, that is, a meter operated at the speed of agreement for basic rates will show a money drop of distance travelled which is exactly the same as for time elapsed.

Example:

Basic rate for time ... 10 paise per 5 minutes

Basic rate for distance ... 10 paise per $\frac{1}{3}$ km

Then basic rates agree when a distance of $\frac{1}{3}$ km is travelled in 5 minutes, that is, the speed of the vehicle is 4 km per hour.

(k) *Effective cab wheel circumference.*—The distance covered by the cab driven wheel with correctly inflated tyre in one complete revolution

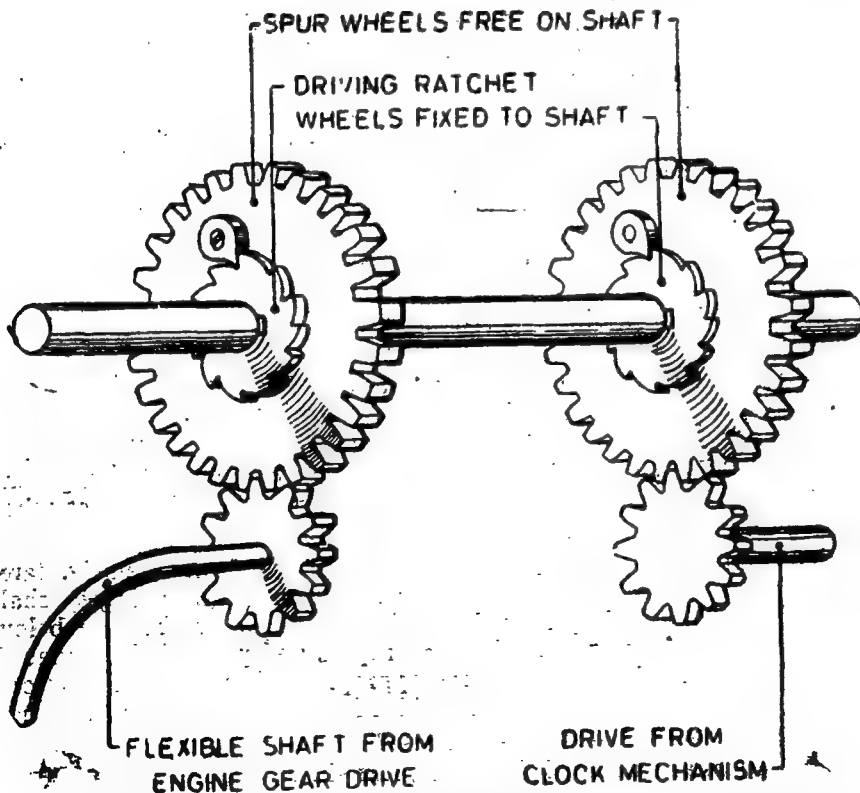


FIG 1.- DIAGRAM ILLUSTRATING THE PRINCIPLE OF THE PICK-UP

when a motor cab with a full complement of passengers is pushed forward in a straight line.

(j) *Pick-up*.—Fare is calculated by the basic rate for time elapsed or alternatively by the basic rate for distance travelled according as the speed of the vehicle is below, or above the speed of agreement of basic rates. The arrangement of the transfer of calculation between the two basic rates is sometimes called the pick-up and sometimes the differential. An example of a simple design of pick-up mechanism within the meter is shown in Fig. 1.—

(m) *Bench Test*.—The test of a taximeter independent of the taxi cab.—

(i) *Distance test*.—The test to check the equivalent distance intervals, without effect of time, between money drops.

(ii) *Time test*.—The test to check only the time intervals between money drops.

(n) *Road Test*.—The test over a measured course of a complete taximeter assembly when installed on the motor cab, the mechanism being actuated as a result of the motor cab travel.

(o) *Gear Box*.—An assembly of gears to permit adjustments for different tyre sizes, transmission ratios and the like.

2. CONSTRUCTIONAL REQUIREMENTS:

(a) The taximeter shall be so designed and constructed as to ensure reliability over a long period.

(b) The taximeter shall be designed to register the fare to be charged for the distance travelled at a speed of or exceeding the speed of agreement of basic rates, and for the time elapsed when the cab is stationary or moving slower than the speed of agreement of basic rates.

(c) When the fare is recorded by the distance mechanism, the first change in fare shall occur only when the prescribed distance has been travelled. After that, the indication shall change in steps proportional to the distance.

(d) *Mechanical*.—The mechanism for recording the time shall function, when required, as a clock. It shall be started by actuation of the flag. In the case of mechanical clock, it shall be capable of running 10 hours continuously.

(e) Every meter shall be so constructed as to indicate in suitable window upon the face the fare computed by time and/or by distance.

(f) The meter shall be provided with an illuminated sign indicating when the cab is FOR HIRE. The lettering used in size, colour and background shall be distinct by day or night at a distance of 25 m. If a plate is attached to the flag then its background colour shall be red.

(g) The nature of information given in each window, namely, fare, position of flag, total and engaged distance, trips and (extra charges), shall be, if provided, indicated by suitable wording immediately above or below the window. The words or signs denoting rupees and paise shall be placed immediately above, below or beside the appropriate disc or drum position. The face shall be provided with a suitable illuminating arrangement when the flag is in the HIRED or STOPPED position.

(h) The letters and numerals indicating fare shall not be less than 10 mm in height and shall be so placed as to be easily read by the passenger. A other letters and numerals required to be shown on meters shall be of such size, form and colour as would render them clearly legible.

(i) When the flag is moved from one position to the other, it shall give an audible warning.

3. MECHANISM AND OPERATION:

(a) The mechanism of meters shall be so designed that:—

- (i) When the flag is upright, the words FOR HIRE shall be indicated in a window in the face. In this position the meter mechanism shall be arrested. No fare shall be visible to the intending hirer.
- (ii) When the flag is rotated forward to the HIRED position, the word HIRED shall replace FOR HIRE in the window. In the HIRED position the clock mechanism shall be released and in action; the distance recording mechanism shall be released and available to record. Also the initial money drop shall be indicated in the fare window. As the cab is used, in due course, further money drops will increase the fare shown.
- (iii) When the flag is rotated further from the FOR HIRE position to the STOPPED position, the word STOPPED shall replace HIRED in the window. The clock mechanism shall be arrested; the distance recording mechanism shall continue to be available to record. The fare shall continue to be indicated in the fare window.
- (iv) The flag shall not move back from the HIRED position to FOR HIRE position unless it passes through the STOPPED position. It shall not go from the STOPPED position to HIRED position without making a positive stop at FOR HIRE position through a locking device to ensure that the mechanism is arrested.
- (v) The time and distance mechanisms shall not be engaged or disengaged except by the normal sequence of operation of the flag arm referred to in (i) to (iv) above.
- (vi) The fare and extra windows in the face shall be covered by a shutter at the FOR HIRE position. The removal and insertion of the shutter shall synchronize with the movement of the flag respectively from FOR HIRE to HIRED and from STOPPED to FOR HIRE.
- (vii) The fare recorded by the meter for time and for distance travelled shall be according to the basic rates prescribed.
- (viii) The amount of fare shown in extra window, (if provided) shall be operated manually and shall advance by monetary units as prescribed.

4. TESTS:

(a) *Fare indications.*—At all stages, the money drops on the dial shall make instant, accurate and complete change from one figure to the next. The error due to engaging and disengaging of the mechanism shall be within the tolerance limits specified in 5.

(b) *Flag.*—When the flag is unlocked from the FOR HIRE position, it should be checked that the last recorded fare has been cleared and the meter is properly re-set at the zero position. There shall be no possibility of the fare recording caught, either partly cleared or on a rebound. It shall be checked that any reverse movement between the ratchet lock and the next does not make improper recording or any kind of injury possible. It should be properly seen that no possibility exists for tampering by improper use of the flag. From the moment the flag is put down the fare should be recorded and the figures expressing it shall appear on the face.

(c) *Distance drive.*—There will always be a critical point in a fare recording mechanism when the next fare increment is almost due to be recorded. Should the journey end at the critical point, which is seldom possible, an impact such as slamping of the car door could cause the next

increment to be recorded. A jerkey drive should be arranged in the test to check that no fault develops in the meter mechanism. Several tests shall be made to check that the possibility of a premature recording of an increment has been kept at a minimum.

(d) *Bench Test*.—The test shall be performed on taximeter fitted with an appropriate and reliable gear box:—

(i) *Apparatus*:

(a) *Test bench*.—For testing taximeters, a device employing an electric motor to turn the taximeter spindle shall be used. This device shall also be capable of being rotated by hand. Brackets shall be provided for convenient mounting of the taximeters.

(b) *Counter*.—Counter shall be of such a design as to register one-tenth of a spindle revolution.

(ii) *Procedure*.—The test shall be carried out in two stages called “Shot Haul” and “Long Haul”:

(a) *Short haul test*.—With the flag in the STOPPED position the meter is driven for the equivalent of a distance of two or three kilometers. The number of input revolutions for each money drop are read from the counter and compared with the calculated number.

(b) *Long haul test*.—The flag shall be in the STOPPED position. The taximeter shall be operated continually for an interval corresponding to not less than 60 kilometers. Throughout the test, the taximeter shall be kept under observation so that any sticking of the money drop, any failure of the money drop to occur in the proper sequence, any incorrect alignment of figures or any other abnormal condition may be discovered which would lead to ejection of the taximeter.

(e) *Time test*:

(i) *Apparatus*.—This test requires that observations shall be made to the nearest second. A stop watch or a desk type of interval timer, which may be started from and re-set to zero as desired, shall be used.

(ii) *Procedure*.—The time test consists of timing the intervals between money drops with the flag in the HIRED position and shall be conveniently divided into two tests, namely, individual interval test, and long interval test:

(a) *Individual interval test*. The individual interval test shall be initiated by depressing the taximeter flag to the HIRED position and simultaneously starting the stop watch or timer. At the instant each money drop occurs, the elapsed time to the nearest second shall be recorded. The watch or timer shall not be stopped, but shall be allowed to continue running throughout the entire period of the time test. The test shall be continued for a minimum of one hour.

(b) *Long interval test*.—The taximeter shall not be cleared at the conclusion of the individual interval test, nor shall the stop watch or timer be stopped. Operation shall be continued for at least one hour or more, without intervening observations. When the test is to be concluded, the time at which money drop occurs shall be observed and recorded after which the taximeter shall be cleared.

5. TOLERANCES:

(a) *Bench Test*.—Tolerances for bench test shall be as follows:—

- (i) On over-registration .. 1 per cent
- (ii) On under-registration .. 1 per cent with an added tolerance of 30 m whenever the initial interval is included in the interval test.

(b) *Time Test*.—Tolerances for time test shall be as follows:—

(i) On individual interval test:

- Over-registration .. 5 per cent
- Under-registration .. 10 per cent on initial interval, 5 per cent on other intervals.

(ii) Long interval test (excluding initial interval):—

- Over-registration .. Not permitted
- Under-registration .. 3 per cent

6. SEALING:

(a) A taximeter head found correct on the bench test shall be sealed. When a complete installation on a motor cab is approved, each of the several connections from taximeter head to transmission (or wheel) shall be similarly sealed.

(b) A plate, of approved size and pattern shall be attached to the taximeter gear box or to the meter itself in such a manner that it cannot be removed without either removing the seal affixed by the testing authority or opening taximeter or the gear box. The plate shall show in raised or sunken words and figures:

- (i) the type of cab on which the taximeter is to be used, and
- (ii) the minimum effective circumference of the tyre on the wheels of the cab by which the taximeter can be driven and by which its action and accuracy may be tested.

7. MARKING:

(a) Taximeters shall be marked indelibly with the number of the instrument on the face plate and back plate.

(b) All letters shall be in Roman script and the numerals shall be Indo-Arabic.

PART II—AUTORICKSHAW METER, DISTANCE AND TIME TYPE

1. TERMINOLOGY:

(a) *Autorickshaw meter, distance and time type*.—A device that computes and indicates the charges for the hire of an autorickshaw according to prescribed rates for distance and/or for time.

(b) *Face*.—That side of autorickshaw meter on which fare is indicated.

(c) *Flag*.—A lever arm or any other device by which the operating condition of the meter is controlled.

(d) *Money Drop*.—An increment in the fare indication.

(e) *Initial Money Drop*.—The fare indication following the depression of the flag from FOR HIRE to the HIRED position.

(f) *Initial Distance or Initial Time Interval*.—The distance or the time interval corresponding to the initial money drop.

(g) *Basic Rates*.—The distance and waiting time rates for distances and time intervals other than those for the initial money drop.

(h) *Fare*.—That portion of the charge for the hire of autorickshaw meter that is computed by an autorickshaw meter through the operation of the distance and time mechanism.

(i) *Speed of agreement of basic rates*.—The speed at which the basic distance and basic time rates correspond, that is, a meter operated at the speed of agreement for basic rates will show a money drop of distance travelled which is exactly the same as for time elapsed.

Example:

Basic rate for time .. 10 paise per minute

Basic rate for distance .. 10 paise per 1/3 km

Then basic rates agree when a distance of 1/3 km is travelled in 5 minutes, that is, the speed of the vehicle is 4 km per hour.

(j) *Effective Autorickshaw wheel circumference*.—The distance [covered by the autorickshaw driven wheel with correctly inflated tyre in one complete revolution when an autorickshaw with a full complement of passengers is pushed forward in a straight line.

(k) *Pick-up*.—Fare is calculated by the basic rate for time elapsed or alternatively by the basic rate for distance travelled according as the speed of the vehicle is below, or above the speed of agreement of basic rates. The arrangement of the transfer of calculation between the two basic rates is sometimes called the pick-up and sometimes the differential. An example of a simple design of pick-up mechanism within the meter is shown in Fig. 1 of Part I of this Schedule.

(l) *Bench Test*.—The test of an autorickshaw meter independent of the autorickshaw:

(i) *Distance Test*.—The test to check the equivalent distance intervals, without effect of time, between money drops.

(ii) *Time Test*.—The test to check only the time intervals between money drops.

(m) *Road Test*.—The test over a measured course of a complete autorickshaw meter assembly when installed on the autorickshaw the mechanism being actuated as a result of the autorickshaw travel.

(n) *Gear Box*.—An assembly of gears to permit adjustments for different tyre sizes, transmission ratios and the like.

2. CONSTRUCTIONAL REQUIREMENTS:

(a) The autorickshaw meter shall be so designed and constructed as to ensure reliability over a long period.

(b) The autorickshaw shall be designed to register the fare to be charged for the distance travelled at a speed of or exceeding the speed of agreement of basic rates, and for the time elapsed when the autorickshaw is stationary or moving slower than the speed of agreement of basic rates.

(c) When the fare is recorded by the distance mechanism, the first change in fare shall occur only when the prescribed distance has been travelled. After that, the indication shall change in steps proportional in the distance.

(d) *Mechanical*.—The mechanism for recording the time shall function when required, as a clock. It shall be started by actuation of the flag. In the case of mechanical clock, it shall be capable of running 6 hours continuously.

(e) Every meter shall be so constructed as to indicate in suitable windows upon the face the fare computed by time and/or by distance.

(f) The meter shall be provided with a sign indicating when the autorickshaw is FOR HIRE. The lettering used in size colour, and background shall be distinct at a distance of 25 m. If a plate is attached to the flag then its background colour shall be red.

(g) The nature of information given in each window, namely, fare and position of flag, shall be indicated by suitable wording immediately above or below the window. The words or signs denoting rupees and paise shall be placed immediately above, below or beside the appropriate disc or drum position.

(h) The letters and numerals indicating fare shall not be less than 10 mm in height and shall be so placed as to be easily read by the passenger. All other letters and numerals required to be shown on meters shall be of such size, form and colour as would render them clearly legible.

3. MECHANISM AND OPERATION:

(a) The mechanism of meters shall be so designed that:—

- (i) When the flag is upright, the words FOR HIRE shall be indicated in a window in the face. In this position the meter mechanism shall be arrested. No fare shall be visible to the intending hirer.
- (ii) When the flag is rotated forward to the HIRED position, the word HIRED shall replace FOR HIRE in the window. In the HIRED position the clock mechanism shall be released and in action; the distance recording mechanism shall be released and available to record. Also the initial money drop shall be indicated in the fare window. As the autorickshaw is used, in due course further money drops will increase the fare shown.
- (iii) When the flag is rotated further from the FOR HIRE position to the STOPPED position, the word STOPPED shall replace HIRED in the window. The clock mechanism shall be arrested; the distance recording mechanism shall continue to be available to record. The fare shall continue to be indicated in the fare window.
- (iv) The flag shall not move back from the HIRED position to FOR HIRE position unless it passes through the STOPPED position. It shall not go from the STOPPED position to HIRED position without making a positive stop at FOR HIRE position through a locking device to ensure that the mechanism is arrested.
- (v) The time and distance mechanism shall not be engaged or disengaged except by the normal sequence of operation of the flag arm referred to in (i) to (iv) above.
- (vi) The fare window in the face shall be covered by a shutter at the FOR HIRE position. The removal and insertion of the shutter shall synchronize with the movement of the flag respectively from FOR HIRE to HIRED, and from STOPPED to FOR HIRE.
- (vii) The fare recorded by the meter for time and for distance travelled shall be according to the basic rates prescribed.

4. TESTS:

(a) *Fare indication.*—At all stages, the money drops on the dial shall make instant, accurate and complete change from one figure to the next. The error due to engaging and disengaging of the mechanism shall be within the tolerance limits specified in 5.

(b) *Flag.*—When the flag is unlocked from the FOR HIRE position, it should be checked that the last recorded fare has been cleared and the

meter is properly re-set at the zero position. There shall be no possibility of the fare recording caught either partly cleared or on a rebound. It shall be checked that any reverse movement between the ratchet lock and the next does not make improper recording or any kind of injury possible. It should be properly seen that no possibility exists for tampering by improper use of the flag. From the moment the flag is put down the fare should be recorded and the figures expressing it shall appear on the face.

(c) *Distance Drive*.—There will always be a critical point in a fare recording mechanism when the next fare increment is almost due to be recorded. Should the journey end at the critical point, which is seldom possible, an impact could cause the next increment to be recorded. A jerkey drive should be arranged in the test to check that no fault develops in the meter mechanism. Several tests shall be made to check that the possibility of premature recording of an increment has been kept at a minimum.

(d) *Bench Test*.—The test shall be performed on autorickshaw meter fitted with an appropriate and reliable gear box:

(i) *Apparatus*:

(a) *Test bench*.—For testing meters, a device employing an electric motor to turn the meter spindle shall be used. This device shall also be capable of being rotated by hand. Brackets shall be provided for convenient mounting of the meters.

(b) *Counter*.—Counter shall be of such a design as to register one-tenth of a spindle revolution.

(ii) *Procedure*.—The test shall be carried out in two stages called “Short Haul” and “Long Haul”:

(a) *Short haul test*.—With the flag in the STOPPED position the meter is driven for the equivalent of a distance of two or three kilometres. The number of input revolutions for each money drop are read from the counter and compared with the calculated number.

(b) *Long haul test*.—The flag shall be in the STOPPED position. The meter shall be operated continually for an interval corresponding to not less than 60 kilometres. Throughout the test, the meter shall be kept under observation so that any sticking of the money drop, any failure of the money drop to occur in the proper sequence, any incorrect alignment of figures or any other abnormal condition may be discovered which would lead to rejection of the meter.

(e) *Time Test*:

(i) *Apparatus*.—This test requires that observations shall be made to the nearest second. A stop watch or a desk type of interval timer, which may be started from and re-set to zero as desired, shall be used.

(ii) *Procedure*.—The time test consists of timing the intervals between money drops with the flag in the HIRED position and shall be conveniently divided into two tests, namely, individual interval test and long interval test:

(a) *Individual interval test*.—The individual interval test shall be initiated by depressing the autorickshaw meter flag to the HIRED position and simultaneously starting the stop watch or timer. At the instant each money drop occurs, the elapsed time to the nearest second shall be recorded. The watch or timer shall not be stopped

but shall be allowed to continue running throughout the entire period of the time test. The test shall be continued for a minimum of one hour.

- (b) *Long interval test.*—The meter shall not be cleared at the conclusion of the individual interval test, nor shall the stop watch or timer be stopped. Operation shall be continued for at least one hour or more, without intervening observations. When the test is to be concluded, the time at which money drop occurs shall be observed and recorded after which the meter shall be cleared.

5. TOLERANCES:

- (a) *Bench Test.*—Tolerances for bench test shall be as follows:—

- | | | |
|----------------------------|-----|--|
| (i) On over-registration | .. | 1 per cent. |
| (ii) On under-registration | ... | 1 per cent with an added tolerance of 30 m whenever the initial interval is included in the interval test. |

- (b) *Time Test.*—Tolerances for time test shall be as follows:—

- (i) On individual interval test:—

- | | | |
|--------------------|----|--|
| Over-registration | .. | 5 per cent. |
| Under-registration | .. | 10 per cent on initial interval,
5 per cent on other intervals. |

- (ii) Long interval test (excluding initial interval):

- | | | |
|--------------------|----|----------------|
| Over-registration | .. | Not permitted. |
| Under-registration | .. | 3 per cent. |

6. SEALING:

(a) An autorickshaw meter head found correct on the bench test shall be sealed. When a complete installation on an autorickshaw is approved, each of the several connections from meter head to transmission (or wheel) shall be similarly sealed.

(b) A plate of approved size and pattern shall be attached to the meter gear box or to the meter itself in such a manner that it cannot be removed without either removing the seals affixed by the testing authority or opening the gear box. The plate shall show in raised or sunken words and figures:

- (i) the type autorickshaw on which the meter is to be used, and
- (ii) the minimum effective circumference of the tyre on the wheels of the autorickshaw by which the meter can be driven and by which its action and accuracy may be tested.

7. MARKING:

(a) Autorickshaw meters shall be marked indelibly with the number of the instrument on the face plate and back plate.

(b) All letters shall be in Roman script and the numerals shall be Indo-Arabic.

PART III—AUTORICKSHAW METER, DISTANCE TYPE

1. TERMINOLOGY:

(a) Autorickshaw meters shall be marked indelibly with the automatically calculates, at a predetermined rate and indicates the charges for hire of an

autorickshaw by distance only. The fare may also have a speedometer and distance indicator (odo-meter).

Note.—The mechanism to calculate fare by the time is not provided in this type of autorickshaw meter.

(b) *Face.*—That side of an autorickshaw meter on which fare is indicated.

(c) *Fare neutralizer.*—A device by which the fare indication is brought to zero.

(d) *Fare.*—The charges for the hire of autorickshaw which are automatically calculated by the fare meter through the operation of the distance mechanism.

(e) *Effective wheel circumference.*—The distance covered by the wheel, with correctly inflated tyre, in one complete revolution when the vehicle with a full complement of passengers is pushed forward in a straight line.

(f) *Bench Test.*—The test of an autorickshaw meter independent of the cab, to check the fare equipment to the distance intervals.

2. CONSTRUCTIONAL REQUIREMENTS:

(a) The autorickshaw meter shall be a simple calculator indicating the fare for the distance travelled or speedometer-cum-fare meter combination with distance indicator (odo-meter).

(b) The drive to the meter shall be from the front wheel or rear axle, or gear box depending upon the arrangement provided by vehicle manufacturer. The instrument shall be calibrated to match the wheel ratio of the vehicle on which it is mounted. It shall carry two counters—one indicating the cumulative distance travelled and the other counter indicating the fare for the specific journey.

(c) The meter shall be provided with a fare neutralizer. The rupee and paise wheel shall be distinguishable. The rupee wheel shall be in black with white digits and paise wheel shall be white with red digits.

(d) The fare neutralizer shall be capable of moving only in one direction manually.

(e) When the fare neutralizer is operated and the fare reading comes to zero, an audible click shall be given. Knocking, vibrations and wear and tear shall not effect the fare reading.

(f) The meter or the autorickshaw shall be fitted with a suitable indicator to show whether the autorickshaw is occupied for hire.

3. TESTS:

(a) At all stages, instant, accurate and complete change from one figure to the next shall occur on the dial when the meter is operated. When the fare neutralizer is brought to the initial position, it should be checked that the last recorded fare has been cleared and the meter is properly re-set at zero position. There shall be no possibility of the fare recording being caught either partly cleared or on a rebound. It shall be checked that any reverse movement between the ratchet lock and the next does not make improper recording or any kind of injury possible. There shall be no possibility of tampering with the fare indication by improper use of the fare neutralizer.

(b) *Distance Drive.*—There will always be a critical point in fare recording mechanism when the next fare increment is almost due to be recorded. Should the journey end at the critical point any impact could cause the next increment to be recorded. A jerky drive should be arranged in the test to check that no fault develops in meter mechanism. Several tests shall be made to check that this possibility has been kept at a minimum.

(c) *Bench test*.—The test shall employ a variable speed electric motor, a counter to note the revolutions per minute and proper brackets for convenient mounting of the meters.

4. TOLERANCES:

(a) Bench test:

(i) On over-registration ..one per cent of fare recorded.

5. SEALING:

(a) After complete installation, the meter shall be properly sealed by suitable temper-proof method. The driving cable shall have provision for sealing at both the ends.

6. MARKING:

(a) Wheel ratio of the vehicle for which the meter is to be calibrated shall be indelibly marked at the back of the meter.

(b) The number of the instrument shall also be marked.

(c) All letters, shall be in Roman script and the numerals shall be Indo-Arabic.

SCHEDULE VIII

(See rule 13)

ABBREVIATIONS OF DENOMINATIONS

1. DECIMAL MULTIPLES AND SUB-MULTIPLES:

Prefix		Value in terms of unit	Abbreviation
kilo	..	1000	k
centi	..	0.01 (10^{-2})	c
milli	..	0.001 (10^{-3})	m
micro	..	0.000,001 (10^{-6})	u

2. WEIGHTS:

Denomination		Value	Abbreviation
tonne	..	1000 kg	t
quintal	..	100 kg	q
kilogram	..	1 kg	kg
gram	..	1 g	g
milligram	..	1 mg	mg
carat	..	200 mg	c

3. CAPACITY:

kilolitre	..	1000 l	kl
litre	..	1 l	l
millilitre	..	1 ml	ml

4. VOLUME:

cubic metre	..	m^3	m^3 or cu m^*
cubic centimetre	..	cm^3	cm^3 or cu cm^*
cubic millimetre	..	mm^3	mm^3 or cu mm^*

*Both these abbreviations are current; but the first set should preferably be used, the former abbreviation is used internationally.

Denomination	Value	Abbreviation
5. LENGTH:		
kilometre:	1000 m	km
metre	1 m	m
centimetre	1 cm	cm
millimetre	1 mm	mm
micron	1/1000 mm or 10^{-3}	um

6. AREA:		
square kilometre	1,000,000 m ²	km ² or sq km*
square metre	m ²	m ² or sq m*
square centimetre	cm ²	cm ² or sq cm*
square millimetre	mm ²	mm ² or sq mm*

7. LAND MEASURES:

are	100 m ²	a
hectare	100 a	ha
centiare	m ²	ca

*Both these abbreviations are current, but the first set should preferably be used, the former abbreviation is used internationally.

RULES FOR ABBREVIATIONS

1. Do not make any change, such as addition of 's' to indicate plurality e.g., write 1 kg, 20 g, 5 g, 10 t, 20 ml, 27 t, 165 km, 2 mm, 100 cm².
2. Do not capitalize the abbreviations for example, do not write 1 KG, 2 KG, 20 MM, 50 MM, the right way is 1 kg, 2 kg, 20 mm, 50 mm, etc.
3. Do not use any other abbreviations except those given above.

SCHEDULE IX

(See rule-14)

Book No.....

CERTIFICATION OF VERIFICATION THE HIMACHAL PRADESH WEIGHTS AND MEASURES (ENFORCEMENT) ACT, 1968

Controller of Weights and Measures, Himachal Pradesh.

Name of Inspector..... No.....

I hereby certify that I have this day verified and stamped/rejected the undermentioned weights, measures, etc. belonging to.....

Locality.....

Trader No..... under the above Act.

Quantity	Denomina- tion	Weighing instruments	Measuring instruments	Verification fee	
	Weights/measures	Capacity	Class	Manufacturer/ Type	Rs. P.
Carriage/conveyance adjusting charges, etc.					
Rs.	P.				
Total Rs. Dated					
Repaired by					
Licence No.					
Next verification is due on					
Inspector, Weights and Measures.					

N.B.—In case of rejection detailed reasons to be given overleaf.

1. This certificate of verification shall be exhibited in a conspicuous place in the premises where the weights, measures or weighing or measuring instruments to which it relates, are used. In case of a hawker this certificate shall be kept on his person.

2. Received the apparatus duly stamped.

Signature of the trader.

SCHEDULE X

(See rule 15)

MAXIMUM PERMISSIBLE ERRORS IN NET WEIGHTS OR MEASURE OF PACKED COMMODITIES

- | | <i>Permissible error</i> |
|---|--|
| 1. RAW COTTON: | |
| Packed in standard bales of 180 kg: | ± 5 kg |
| 2. COTTON YARN: | |
| Full bale of 180 kg | ± 5 kg |
| 3/4 bale of 135 kg | ± 3.75 kg |
| 1/2 bale of 90 kg | ± 2.50 kg |
| 1/4 bale of 45 kg | ± 1.25 kg |
| 3. CEMENT: | |
| At factory | ± 2 per cent |
| In retail trade | ± 3 per cent |
| 4. TEA: | |
| Retail packages of 500 g, 250 g and 100 g | ± 1 per cent at the place of packing |
| Chests packed at places other than than tea gardens | ± 1 per cent at the place of packing |
| The net weight of packages or chests of tea shall be verified only at the place of packing. | |
| 5. JUTE CLOTH: | |
| Length of jute cloth | ± 5 per cent |

	<i>Permissible error</i>
6. PAINT ..	± 1 per cent
7. BEER AND SPIRITS FILLED IN BOTTLES:	
Beer ..	(—) 2.0 per cent
Spirits ..	(—) 2.0 per cent, subject to a maximum of (—) 7.5 ml.
The net measure of beer or spirits in bottles shall be verified at the place where they are bottled.	
8. BISCUITS:	
Below 500 g ..	± 7 per cent
500 g and above but below 1 kg ..	± 6 per cent
1 kg and above but below 2 kg ..	± 5 per cent
2 kg and above ..	± 2.5 per cent
9. PIECE GOODS:	.. An error not exceeding 7 per cent
10. FOODGRAINS:	
Bags of 90 to 100 kg ..	+0.5 per cent at the place of packing.
11. SUGAR:	
White sugar packed in bags holding 1 quintal ..	± 0.1 per cent
12. INFANT FOOD:	
Packages with net content between 1 kg and 2 kg ..	± 3 per cent
Packages upto 500 g ..	± 5 per cent
Packages between 500 g and 1000 g ..	± 4 per cent
13. COTTON YARN:	
(a) Full bale of 200 kg ..	± 10 kg
(b) Three-quarter bale of 150 kg ..	± 7.5 kg
(c) Half bale of 100 kg ..	± 5 kg
(d) Quarter bale of 50 kg ..	± 2.5 kg
14. COTTON CLOTH:	
(a) Full bale of 1500 m ..	± 100 m
(b) Three-quarter bale of 1125 m ..	± 75 m
(c) Half bale of 750 m ..	± 50 m
(d) Quarter bale of 375 m ..	± 25 m
15. MILK:	
Bottle of capacity 500 ml ..	± 10 ml
Bottle of capacity 250 ml ..	± 8 ml
Bottle of capacity 200 ml ..	± 8 ml
16. BOMBAY HALWA:	
1 kg or above ..	± 2.5 per cent
Above 250 g but below 1 kg ..	± 5.0 per cent
250 g or below ..	± 8.0 per cent

SCHEDULE XI

(See rule 17)

PROCEDURE TO BE FOLLOWED FOR INSPECTION, VERIFICATION AND STAMPING OF COMMERCIAL WEIGHTS AND MEASURES AND WEIGHING AND MEASURING INSTRUMENTS USED OR FOR USE IN TRANSACTIONS

PART I—WEIGHTS AND MEASURES

1. WEIGHTS:

(a) All weights before stamping shall be verified for correctness against the corresponding working standard weight in the appropriate working standard balance subject to the permissible errors specified.

(b) Weights shall be stamped on the lead in the loading hole at the bottom of the weight, provided that weights without an adjusting hole shall be stamped on the under surface.

(c) No weights used in gold and silver trade shall be stamped unless they are bullion weights.

(d) No weights used in pearl and precious stone trade shall be marked unless they are carat weights.

2. LIQUID MEASURES OF CAPACITY:

(a) Liquid capacity measures shall be tested by filling the working standard measure with water and emptying the contents of the working standard into the measure under test.

(b) In testing a glass measure, the capacity of which is not defined by the brim, the level of the water shall be taken at the bottom of the mensicus.

(c) Where the capacity is indicated by a line, the measure shall be tested to the bottom of the line.

3. MEASURES OF LENGTH:

(a) Every measure of length shall be verified by comparison with the working standard.

(b) A link measure, or woven metallic or steel tape measure, shall be tested when subjected to a tension or pull as follows:—

Link measures	..	8 kg
Woven Metallic Tape Measures	..	1 kg
Steel Tape Measure	..	2 kg for 1 m and 2 m tapes and 5 kg for 10 m, 15 m, 20 m, 30 m, 50 m tapes.

(c) The measure under test shall be supported throughout its whole length on a plane and even base.

(d) Tape measures which are intended to be used in cases may be accepted for verification and stamping if submitted even without the case.

(e) All non-flexible measures of length shall be stamped on the rivets provided in the measures.

(f) In the case of tape measure, the stamp shall be placed on the metal strip attached to the beginning of the measure.

(g) In the case of link measure, the stamp shall be placed either on a metal label permanently attached to the measure or on the brass handle.

4. VOLUME MEASURES:

(a) All measures of volume shall be examined with the subject of discovering flaws or want of straightness and proper right angles at the corners.

(b) Every measure of volume shall be verified by comparing length of each side against the working standard of length at or near the normal temperature.

(c) The limits of errors in the case of lengths of the sides of measures of volume shall be the same as prescribed for linear measures.

(d) All measures of volume shall be stamped near the top edge or brass plate securely fastened to them.

PART II—WEIGHING AND MEASURING INSTRUMENTS

1. GENERAL:

Weighing and measuring instruments shall be tested to conform to the specification given in Schedule VI.

2. BEAM SCALES:

(a) On beam scales, the verification stamp shall be placed on the stud or plug on the beam, immediately under or over the central knife edge.

(b) The Inspector may stamp the plug or stud in the same manner as he would stamp a weight.

3. COUNTER-MACHINES, SPRING BALANCES, STEELYARDS AND AUTOMATIC MACHINES:

The verification stamp shall be placed upon the plug or stud provided in the instrument for that purpose.

4. PLATFORM MACHINES AND WEIGHBRIDGES:

(a) Weighbridges, platform machines and such other weighing instruments as the Controller may specify in this behalf, shall be verified and stamped *in situ* in addition to any preliminary test in the manufacturer's or dealer's premises. Such a preliminary test shall be made at the request of the manufacturer or dealer.

(b) The verification stamp shall be placed upon the plug or stud provided for the purpose in the machine.

5. CRANE MACHINES:

(a) Hydraulic machine in which it is necessary in order to get a correct weight indication, to twist the load hook, shall not be stamped unless a prominent notice to this effect is permanently affixed to the machine.

(b) The verification stamp shall be placed upon the plug or stud provided for the purpose in the machine.

PART III—CALIBRATION OF VEHICLE TANKS FOR PETROLEUM PRODUCTS AND OTHER LIQUIDS

1. DEFINITIONS:

(a) *Vehicle Tank*.—An assembly used for the delivery of liquids comprising a tank which may or may not be sub-divided into compartments, mounted upon a vehicle together with its necessary piping, valves, meters, etc.

(b) *Compartment*.—The entire tank, when this is not sub-divided otherwise, anyone of these sub-divisions of a tank designed to hold liquid.

(c) *Calibration*.—Verification and stamping of the capacity of the vehicle tank.

(d) *Dip-stick*.—A square or a rectangular metal bar of brass or any other suitable hard material used to determine the depth of the liquid in the tank.

(e) *Ullage stick*.—A T-shaped metal bar of brass or other suitable material used to determine the depth of the level of liquid from the top of the dip pipe.

(f) *Ullage Indicator*.—A device bolted to the inside of a manhole neck ring with the indicator set to any desired level to which liquid in the tank is required to be filled.

2. TESTING MEDIUM:

(a) *Compartment Testing*.—Water or other appropriate liquid shall be used as a testing medium in determining the capacity of a vehicle tank compartment.

(b) *Meter Testing*.—A vehicle tank meter shall be tested with a liquid of the same character or of approximately the same viscosity as the liquid to be commercially measured through the meter.

3. EQUIPMENT AND TOOLS:

The following equipment and tools are required for calibration of vehicle tank:—

(a) *Proving Measures*.—When available, shall be checked for accuracy against an appropriate working standard measure.

(b) *Calibrated Bulk Meter*.—An accurate meter fitted with a pre-set valve, air eliminator and strainer, which has been checked for accuracy against an appropriate working standard measure.

(c) A set of standard commercial measures.

(d) Other equipment and tools viz., hose pipes, scribe, punch, try square, tyre pressure gauge, hammer, etc.

4. CALIBRATION PROCEDURE:

(a) Vehicle tanks used as measures shall be calibrated as capacity measures. In the case of meter equipped tanks, the meter shall be treated as a separate measuring instrument for purpose of calibration.

(b) The compartment capacity or capacities shall be taken as including the capacities of the delivery lines leading from the emergency, safety or master valve of the outlet valve (discharge valve) provided that in the case of vehicle compartments terminating in a single delivery pipe line fitted with an outlet valve, the compartment capacity or capacities shall be taken as excluding the capacity of the delivery pipe line. A notice shall be prominently exhibited on the vehicle tank indicating clearly and indelibly the following:—

Marked capacity includes capacity of delivery line

Marked capacity excludes or capacity of delivery line

as the case may be. The safety or master valve shall be positioned at the lowest point of outlet from the compartment.

(c) The proving measure of bulk meter should be mounted on an overhead gentry or a separate frame work in a convenient position above a firm and level platform, preferably of concrete on which the vehicle stands during calibration.

(d) The vehicle shall be placed in a level position before commencing calibration as the accuracy of calibration depends on the level of the tank;

the sequence in which compartments are calibrated should be such as to minimise unequal spring deflection on the axles of the vehicle.

(e) The front and rear tyres of the vehicle should be at the correct pressures. The tyres should be inspected for wear which should be reasonably even and there should not be excessive difference in wear in the tread between the front set of tyres and the rear set at the time of calibration.

(f) The interior of the compartment should be inspected and cleaned where necessary.

(g) Before starting calibration, the pipelines, outlet valves and other connections shall be tested against leakage by partially filling and draining each compartment in turn through the outlet valve. During the process sufficient quantity of the testing medium should be introduced inside the compartment to wet the internal surface of the tank and pipelines.

(h) After taking the precautions mentioned above, the compartment to be calibrated shall be filled with appropriate proving measures or bulk meters to the marked capacity of the compartment with the delivery lines leading to the outlet valve full or empty as provided in (b) above. The dip/ullage mark shall be taken carefully and the line shall be cut on the dip/ullage stick at right angles to the axis with the help of try-square and scriber. If any ullage indicator is used, it shall be correctly set and sealed.

(i) A mark should also be made on the dip stick to indicate the proof line which is the level of the top surface of the dip pipe. In the case of ullage stick, the distance from the ullage point to the T-joint should be marked on the stick.

(j) Each compartment should be left full before proceeding to the next in sequence.

5. PERMISSIBLE ERRORS:

(a) Proving measures shall have the following capacities and shall be adjusted within the following permissible errors:—

<i>Capacity (litres)</i>	<i>Permissible error (millilitres)</i>
50	50
100	100
200	200
500	500
1000	1000
1500	1500
2000	2000
5000	5000

(b) The maximum error for vehicle tank compartment shall be 0.05 per cent in excess of the marked capacity of the compartments.

6. MARKINGS:

(a) The vehicle shall have a brass plate riveted in a prominent position on it to receive the Inspector's stamps. The brass plate shall bear the following particulars: title of Weights and Measures Act, name of owner of vehicle, vehicle registration number, and the serial number and capacity of each compartment. Space should be provided on the plate for the Inspector's stamps. Fig. 1 shows a simple design for a plate.

(b) The capacity of the compartment shall be indelibly marked on the manhole cover of the compartment and also painted on each side of the compartment so that it is clearly visible. If there are more than one compartments then each compartment shall have its capacity marked separately as

above and the compartments numbered serially. The number of the compartment shall also be marked on the discharge value pertaining to the compartment.

(c) The vehicle registration number as well as the capacity of the compartment shall be indelibly marked on the dip/ullage stick at the top end. If there is more than one compartment, the different faces of one dip stick may be used for marking and each face shall bear the vehicle number, the serial number of the compartment, the proof and dip lines of that compartment and the capacity of the compartment.

THE HIMACHAL PRADESH WEIGHTS AND MEASURES (ENFORCEMENT) ACT, 1968

Name of the Company.....

Vehicle Tank No.....

Compartment number	Compartment capacity in litres	Space for Inspector's stamp
--------------------	-----------------------------------	--------------------------------

Fig. 1.—Name Plate

SCHEDULE XII

(See rule 20)

FEES PAYABLE FOR VERIFICATION AND STAMPING OF WEIGHTS, MEASURES AND WEIGHING AND MEASURING INSTRUMENTS

1. WEIGHTS:

(a) Bullion Weights:

<i>Denomination</i>	<i>Fee per piece</i> Rs.
20 kg	3.00
10 kg	3.00
5 kg	2.00
2 kg	2.00
1 kg	2.00
500 g	0.75
200 g	0.75
100 g	0.75
50 g	0.75
20 g	0.75
10 g	0.75
5 g	0.75
2 g	0.75
1 g	0.75
500 mg	0.50
200 mg	0.50
100 mg	0.50
50 mg	0.50
20 mg	0.50
10 mg	0.50
5 mg	0.50
2 mg	0.50
1 mg	0.50

<i>Denomination</i>	<i>Fee per piece</i>
	Rs.
(b) Brass Weights (other than Bullion):	
1kg	2.00
500 g	0.50
200 g	0.50
100 g	0.50
50 g	0.25
20 g	0.25
10 g	0.25
5 g	0.25
2½g	0.25
1 g	0.25
(c) Sheet Metal Weights (other than Bullion):	
500 mg	0.25
200 mg	0.25
100 mg	0.25
50 mg	0.25
20 mg	0.25
10 mg	0.25
5 mg	0.25
2 mg	0.25
1 mg	0.25
(d) Iron and Steel Weights:	
50 kg	1.00
20 kg	1.00
10 kg	1.00
5 kg	1.00
2 kg	0.75
1 kg	0.75
500 g	0.25
200 g	0.25
100g	0.25
50g	0.25
(e) Carat Weights:	
500 c	1.00
200 c	1.00
100 c	1.00
50 c	1.00
20 c	1.00
10 c	1.00
5 c	1.00
2 c	0.50
1 c	0.50
50/100 c	0.50
20/100 c	0.50
10/100 c	0.50
5/100 c	0.50
2/100 c	0.50
1/100 c	0.50
0.5/100 c	0.50

2. CAPACITY MEASURES (INCLUDING VEHICLE TANKS, DISPENSING MEASURES AND PEG MEASURES):

50 litres and above

Rs. 5.00 for the first 100 litre or part thereof plus Rs. 2.00 for every additional 100 litres or part thereof subject to a maximum of Rs. 500.00.

Denomination

Fee per piece

Rs.

20 l	2.00
10 l	2.00
5 l	1.00
2 l	1.00
1 l	1.00
500 ml	0.50
200 ml	0.50
100 ml	0.50
50 ml	0.50
20 ml	0.50
10 ml	0.50
5 ml	0.50
2 ml	0.50
1 ml	0.50
18.5 l	2.00
60 ml	0.50
30 ml	0.50

3. LENGTH MEASURES:

(a) Non-flexible:

2.00 m	1.00
1.00 m (ordinary)	1.00
0.50 m (ordinary)	1.00
1.00 m (graduated at every cm)	2.00
0.50 m (graduated at every cm)	2.00

(b) Woven Metallic Tapes:

50 m	3.00
30 m	3.00
20 m	2.00
15 m	2.00
10 m	2.00
5 m	1.00
2 m	1.00

(c) Steel Tapes:

50 m	5.00
30 m	5.00
20 m	3.00
15 m	3.00
10 m	2.00
2 m	1.00
1 m	1.00

(d) Folding Scales:

1 m	1.00
0.5 m	0.50

(e) Surveying Chains:

30 m	3.00
20 m	2.00

4. WEIGHING INSTRUMENTS (OTHER THAN BEAM SCALES OF CLASSES C AND D AUTOMATIC WEIGHING MACHINES AND TOTALISING MACHINES):

<i>Denomination</i>	<i>Fee per instrument</i>
	Rs.
400 t	250.00
300 t	200.00
200 t	150.00
150 t	120.00
100 t	100.00
80 t	90.00
60 t	80.00
50 t	70.00
40 t	70.00
30 t	70.00
25 t	50.00
20 t	50.00
15 t	50.00
10 t	40.00
5 t	40.00
3 t	25.00
2 t	25.00
1500 kg	15.00
1000 kg	15.00
500 kg	15.00
300 kg	15.00
250 kg	15.00
200 kg	10.00
150 kg	10.00
100 kg and person weighing machines	10.00
50 kg	7.50
30 kg	7.50
20 kg	5.00
15 kg	5.00
10 kg	3.00
5 kg	3.00
3 kg	3.00
2 kg	3.00
1 kg	3.00
500 g and below	2.00

5. BEAM SCALES (CLASSES C AND D):

1000 kg	15.00
500 kg	10.00
300 kg	10.00
200 kg	5.00
100 kg	5.00
50 kg	3.00
20 kg	3.00
10 kg	3.00

<i>Denomination</i>	<i>Fee per instrument</i>
	Rs.
5 kg	2.00
2 kg	2.00
1 kg	2.00
500 g and below	1.00
6. AUTOMATIC WEIGHING MACHINES:	
Exceeding 10 t	100.00
Not exceeding 10 t but exceeding 1t	75.00
Not exceeding 1t but exceeding 50 kg	50.00
Not exceeding 50 kg but exceeding 10 kg	30.00
Not exceeding 10 kg	20.00
7. TOTALISING MACHINES:	
Each machine	150.00
8. VOLUME MEASURING INSTRUMENTS:	
(a) Dispensing pumps (each pump)	50.00
(b) Other Instruments:	
Exceeding 100 litres	Rs. 50.00 for the first 100 litres plus Rs. 40.00 for each additional 100 litres or part thereof subject to a maximum of Rs. 500.00.
Not exceeding 100 l but exceeding 50 l	40.00
Not exceeding 50 l but exceeding 20 l	25.00
Not exceeding 20 l	20.00
9. LINEAR MEASURING INSTRUMENTS:	
(a) Taxi meters and Autorickshaw meters:	
Each taximeter or autorickshaw meter	5.00
(b) Other Instruments:	
Exceeding 100 m	Rs. 10.00 for the first 1000 m plus Rs. 2.00 for every additional 100 metres or part thereof subject to a maximum of Rs. 50.00.
Not exceeding 1000 m but exceeding 500 m	10.00
Not exceeding 500 m but exceeding 100 m	5.00
Not exceeding 100 m	3.00

SCHEDULE XIII
(See rule 29)
LICENSING FORMS

FORM "A"
OFFICE OF THE CONTROLLER OF WEIGHTS AND MEASURES
HIMACHAL PRADESH

Licence to manufacture/repair weights, measures, weighing instruments
or measuring instruments

Licence No..... Year.....

(1) The Controller of Weights and Measures, Himachal Pradesh Govern-
ment hereby grants to:—

(Name and address of Party or Parties).....

.....
a licence to manufacture/repair the following:—

(Include details of the types of weights, measures, weighing instruments
or measuring instruments that are licensed to be manufactured/repared
by the party).

(2) The licence is valid for the party named above in respect of his
workshop located at.....

.....
(3) This licence is valid from.....to.....

(4) The manufacturer/repairer shall comply with the conditions noted
below. If he fails to comply with any one of these, his licence is liable to be
cancelled.

The trade mark/monogram being used by the manufacturer is as under:—

Date.....
Place.....

(Signature)
Controller of Weights and Measures,
Himachal Pradesh Government, Simla.

Seal.

Note.—In the case of a firm, its name with the names of all its members
should be given in paragraph (1).

CONDITIONS OF LICENCE

1. The person in whose favour this licence is issued shall:—

- (a) comply with all the relevant provisions of the Act and Rules for
the time being in force;
- (b) not encourage or countenance any infringement of the provisions
of the Act, or the Rules for the time being in force and shall
report without delay to the Inspector any infringement that may
come to his notice;
- (c) keep this licence exhibited in some conspicuous part of the
premises to which it relates;
- (d) comply with any general or special directions that may be given
by the Controller of Weights and Measures of Himachal Pradesh
Government;

(e) surrender the licence if and when required to do so by the Controller or any other officer employed under the Act.

2. Every condition prescribed after the issue of this licence shall if notified in the Official Gazette be binding on the person/persons to whom the licence has been granted.

FORM "B"

OFFICE OF THE CONTROLLER OF WEIGHTS AND MEASURES
HIMACHAL PRADESH

Licence to a dealer in weights, measures, weighing instruments or measuring instruments

Licence No..... Year.....

(1) The Controller of Weights and Measures, Himachal Pradesh Government hereby grants to:—

(Name and address of Party or Parties).....

a licence to deal in the following:—

(Indicate details of the types of weights, measures, weighing or measuring instruments that are licensed to be dealt with by the party).

(2) The licence is valid for the party named above in respect of his premises located at.....

(3) This licence is valid from..... to.....

(4) The dealer shall comply with the conditions noted below. If he fails to comply with any one of these, his licence is liable to be cancelled.

Date.....
Place.....

(Signature)
Controller of Weights and Measures,
Himachal Pradesh Government, Simla.

Seal.

Note.—In the case of a firm, its name with the names of all its members should be given in paragraph (1).

CONDITIONS OF LICENCE

1. The person in whose favour this licence is issued shall:—

- comply with all the relevant provisions of the Act and Rules for the time being in force;
- not encourage or countenance any infringement of the provisions of the Act, or the Rules for the time being in force and shall report without delay to the Inspector any infringement that may come to his notice;
- keep this licence exhibited in some conspicuous part of the premises to which it relates;
- comply with any general or special directions that may be given by the Controller of Weights and Measures of Himachal Pradesh Government;
- surrender the licence if and when required to do so by the Controller or any other officer employed under the Act.

2. Every condition prescribed after the issue of this licence shall if notified in the Official Gazette, be binding on the person/persons to whom the licence has been granted.

SCHEDULE XIV

(See rule 29)

**LICENSING AND RENEWAL FEES FOR MANUFACTURERS,
REPAIRERS OR DEALERS OF WEIGHTS, MEASURES,
WEIGHING OR MEASURING INSTRUMENTS**

Manufacturers	.. Rs. 25.00 per year
Repairers	.. Rs. 5.00 per year
Dealers	.. Rs. 10.00 per year

SCHEDULE XV

(See rule 29)

Register of licensed manufacturers/repairers/dealers in weights/measures/weighing instruments and measuring instruments

OFFICE OF THE CONTROLLER OF WEIGHTS AND MEASURES, HIMACHAL PRADESH GOVERNMENT

Licence No.	Date of issue	Name, parentage and residential address of the manufacturer/repairer/dealer	Place where work-shop is situated	Articles to be manufactured/ repaired/sold	Trade mark/ monogram being used	Order regarding cancellation	Result of appeal	Remarks
1	2	3	4	5	6	7	8	9

- Notes.—1. In the case of the firm, its name with the names of all its members shall be given in column 3.
2. Column 6 does not apply to repairers and dealers.

श्रीमन्महाराज राजपूत, हिमाचल प्रदेश, २४ अक्टूबर, १९७०/३ अगस्त, १८६२ ४५६

SCHEDULE XVI

(See rule 33)

FORM OF APPEAL AGAINST AN ORDER OF AN INSPECTOR :
OR THE CONTROLLER

(Prescribed Court fee)

To

.....

.....

- (i) Name and address of the appellant.....
(ii) Date of original order of Inspector/Controller against which the
appeal is preferred.....
(iii) Whether the appellant desires to be heard in person or through an
authorised representative.....
(iv) Grounds of appeal:

P. K. MATTOO,
Secretary (Industries).